

MACTEC Engineering and Consulting, Inc. 107 Audubon Road, Building 2, Suite 301 Wakefield, Massachusetts 01880

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			St. Cartilla	ITAL LETTER						
To: Stephen G. N	Morrow, P.E.			Date: June 2, 2009						
Olin Corpora	tion			Client: Olin						
3855 North C	Ocoee Street			Project: 51 Eames Street, Wilmington, MA						
Suite 200										
Cleveland, T	ennessee 373	12	MACTEC PN: 6107-09-0016/12							
				Delivery: U.S.P.S.						
☑ information	□ purcl	·		Enclosed please find the following data validation summary						
☐ estimating ☐ construction ☐ comments and/or approval ☐ see remarks			reports for th	e Olin Chemical Superfund Site, Wilmington, Massachusetts.						
			Propagad Pyr	Annette Savastano						
Number	Revision No.	No. of Copies	терагеи ву.	Title or Description						
1	-	1	Data Validation Report, February 2009 Slurry Wall Surface Water and Groundwater, Olin Chemical Superfund Site, Wilmington, Massachusetts, TestAmerica Laboratories Data Sets 360-21330 and 360-21354							
2	_	1	Data Validation Summary, March 2009 Residential Well Samples, Olin Chemical Superfund Site, Wilmington, Massachusetts, TestAmerica Data Se 360-21622, Lancaster Laboratory Data Set OLN14 (1136871)							
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Brian Guichard, Ol	in Wilmington		T C X X	T C						
MACTEC Project F			XX							
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			Deliverak	ole Review Form		
1	Project Informati	ion:				
	Project Name:	Olin Chemical Su	perfund Site			
	Project Number:	6107-09-0016		Project Manager:	Peter Thomps	on
	Document Name:	Data Validation F	Report - February 2	009 Slurry Wall/Cap		•
	Document Revision	on Number:		Revision Date:		
	Prepared By:					
2	Technical Review	w: This document	has been independ	dently reviewed for tech	nical adequacy, va	alidity, feasibility, continuity,
			•	•		of this document has been
	Subject Area(s):	Initial Data Valida	ation			
	Printed Name:	Wolfgang Calicch	nio		•	·
	Signature:	11/1/	Wellen		Date:	5/28/09
	Subject Area(s):	Senior Data Valid	lation			
	Printed Name:	Chris Ricardi			-	1
	Signature:	Cha	n sa coull		Date:	5/27/09
	Subject Area(s):	QC Review				
	Printed Name:					
	Signature:				Date:	
	Created by: List of reviewed T Created by:	ables/Figures/Appe KJC 03/17/09 ables/Figures/Appe KJC 05/26/09	Checked by: endices: Ta Checked by:	WDC 05/19/09 able 2 - Final Results Su WD/CR	Date:	5/19/09 5/27/2009
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	Print Name:	Peter Thompson				
_	Signature:				Date:	
5	conformance with	n the company's sta		ent has been reviewed al and document quality		release and is in
	Print Name:	Michael Murphy				
	Signature:				Date:	
6	NA This is a	Standard Contract		ontract, Subcontract, ecked & stamped by an		
*		contracts and/or ar 0-7 and LD-30 for m		other standard compan	y contracts shall b	e reviewed by an OCA. Se
				act first, then return th		for our signature on

	Deliverable Review Form	(Continued)
	Sections 7-9 to be Completed by An	nette\Project Assistant
7	Copy Editing: This document has been checked to ensure correct missing text, figures, tables); accuracy (index, page numbers, internal specified format and style requirements (whether MACTEC format of document was performed by: Print Name:	al references); continuity of style; and conformance to
	Signature:	Date:
8		
	MACTEC's copy is a "duplicate original" of the client's original This is a Draft - Transmittal signed by Principal is attached This is a Final - Project Manager & Principal wet signatures And all Tables/Figures/Appendices have wet initials for Final This is a PDF electronic delivery sent via email. A printout and a copy of the transmittal email sent to the client is at If Absentee Signature was used - Approval from absentee Absentee Signature Policy Update - The authorized em "for with permission." Documentation of perm	inal and is stamped "File Copy" to Client's & MACTEC's File Copy s on Client's & MACTEC's File Copy Reviewed By/Checked By per QA Policy of the deliverable that was sent to client tached to the printout and stamped File Copy is attached to File Copy (see policy update below). ployee should sign their own name and the phrase
9	Timeliness Database: NA	
	Original Deliverable Due Date:	Actual Delivery Date:
	Variance Explanation (if applicable):	·
10	0 Use this space for any additional notes/comments/signatures:	



Engineering and Consulting, Inc.

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Home Page: www.mactec.com

To: Steve Morrow From: Chris Ricardi Date: June 2, 2009

Subject: Interim Response Steps Work Plan Slurry Wall Monitoring Program 1Q09–February 2009

DATA VALIDATION REPORT
FEBRUARY 2009 SLURRY WALL SURFACE WATER AND GROUNDWATER
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS
TestAmerica Laboratories Data Sets 360-21330 and 360-21354

1.0 INTRODUCTION

Surface water and groundwater samples were collected from the Olin Chemical Superfund Site from February 24 to 25, 2009. Samples were analyzed by TestAmerica Laboratories in Westfield, Massachusetts. Data were reported in sample delivery groups (SDGs) 360-21330 and 360-21354. A summary of samples included in this review is contained in Table 1. Samples reviewed in this report were analyzed for the following USEPA SW-846 (USEPA, 1996), USEPA wastewater (USEPA, 1993), or Standard Methods (APHA, 1995):

- dissolved and total metals (aluminum, chromium, and sodium) by USEPA Method 6010B in surface water
- dissolved metals (aluminum and chromium) by USEPA Method 6010B in groundwater
- general chemistry analyses for ammonia by Method 350.1 (Lachat 10-107-06-1), chloride, sulfate, nitrate, and nitrite by Method 300, and specific conductance by SM18 SM 2510B

The Draft Interim Response Steps Work Plan (MACTEC, 2007) and the MADEP Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP) [MADEP, 2004] were used as a reference during the review. Analytical packages were reviewed using the Level 1 Data Quality Evaluation checklists that were developed for the Olin Wilmington annual and quarterly groundwater monitoring tasks. Final sample results are presented on data summaries in Table 2.

2.0 METALS

Data were reviewed for the following parameters:

- Data Completeness
- * Holding Time

Blanks



- * Matrix Spike Analysis
- * Laboratory Duplicate Analysis
- * Field Duplicate Results
- * Laboratory Control Sample
- Detection Limits
- * = indicates that criteria were met for this parameter

Blanks

Dissolved aluminum (6.1 μ g/L) was reported in the method blank associated with all samples in SDG 360-21330. An action level (30.5 μ g/L) was calculated at five times the blank concentration and compared to sample data. The low concentration detection of dissolved aluminum in sample OC-GW-25 was qualified non-detected (U) at the reporting limit.

The laboratory qualified sample results with a (B) when the analyte was detected in the sample and associated method blank. The (B) qualifier was removed from the final data set.

3.0 GENERAL CHEMISTRY - Ammonia, Chloride, Sulfate, Nitrate, Nitrite, and Specific Conductance

Data were reviewed for the following parameters:

- Data Completeness
- * Holding Time
- * Blanks
 - Matrix Spike Analysis
- Laboratory Duplicate Analysis
- Laboratory Control Sample
- Detection limits
- * = indicates that criteria were met for this parameter

Matrix Spike Results

A chloride MS/MSD analysis was completed using sample OC-GW-202D. The chloride MS/MSD percent recoveries (70 and 66) are less than the lower project limit of 75. Results for chloride in all samples were qualified estimated (J) and are considered potentially biased low.



Except for the validation actions noted above, the results are interpreted to be usable as reported by TestAmerica.

Chris	Kicardo

6/02/09

Chris Ricardi, NRCC-EAC

Date

Senior Chemist

ΛΛ

Michael Murphy Project Principal

Date

Reference:

- American Public Health Association (APHA), 1995. "Standard Methods for Examination of Water and Wastewater"; 19th Edition; APHA, 1015 Fifteenth St., NW. Washington, D.C. 20005.
- MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site; 51 Eames Street, Wilmington, Massachusetts; July 25, 2007.
- U.S. Environmental Protection Agency (USEPA), 1993. "Methods for Chemical Analysis and Water and Wastes (MCAWW)", EPA/600/4-79-020 (March 1983) with updates and supplements EPA/600/4-91-010 (June 1991), EPA/600/R-92-129 (August 1992) and EPA/600/R-93-100 (August 1993).
- U.S. Environmental Protection Agency (USEPA), 1996. "Test Methods for Evaluating Solid Waste"; Laboratory Manual Physical/Chemical Methods; Office of Solid Waste and Emergency Response; Washington, DC; SW-846; November 1986; Revision 4 -December 1996.



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Table 1 – FEBRUARY 2009 SLURRY WALL MONITORING PROGRAM

				SW846 6010B Total	SW846 6010B Filtered	E350.1 (QuickChem 10-107-06-1- B)	SM 2510B	40CFR136A 300.0
Lab Sample ID	Location	Sample ID	Sample Date					
Groundwater								
360-21330-8	GW-25	OC-GW-25	2/24/2009		2	1	1	2
360-21354-1	GW-202S	OC-GW-202S	2/25/2009		2	1	1	2
360-21354-2	PZ-18R	OC-PZ-18R	2/25/2009		2	1	1	2
360-21354-3	GW-79S	OC-GW-79S	2/25/2009		2	1	1	2
360-21354-4	PZ-17RR	OC-PZ-17RR	2/25/2009		2	1	1	2
360-21354-5	GW-202D	OC-GW-202D	2/25/2009		2	1	1	2
360-21354-6	GW-78S	OC-GW-78S	2/25/2009		2	1	1	2
Surface Water								
360-21330-1	ISCO3	OC-ISCO-3	2/24/2009	3	3	1	1	4
360-21330-2	ISCO2	OC-ISCO-2	2/24/2009	3	3	1	1	4
360-21330-3	PZ-16RR	OC-PZ-16RRSW	2/24/2009	3	3	1	1	4
360-21330-4	PZ-17RR	OC-PZ-17RRSW	2/24/2009	3	3	1	1	4
360-21330-5	SD-17	OC-SD-17	2/24/2009	3	3	1	1	4
360-21330-6	PZ-18R	OC-PZ-18RSW	2/24/2009	3	3	1	1	4
360-21330-7	ISCO1	OC-ISCO-1	2/24/2009	3	3	1	1	4

Notes:

Number listed under method indicates number of target analytes reported.

Prepared

by/Date: Checked

ate: KJC 03/17/09

by/Date:

WDC 5/19/09

Table 2

Final Results Summary - 360-21330 & 360-21354 February 2009 Slurry Wall / Cap Groundwater and Surface Water Olin Chemical Superfund Site Wilmington, Massachusetts

			Loc Name	GW-20	02D	GW-2	.02S	GW-	25	GW-7	78S	GW-7	79S
		Field Sample ID		OC-GW-	OC-GW-202D		OC-GW-202S		OC-GW-25		OC-GW-78S		V-79S
		Fie	eld Sample Date	02/25/09		02/25/09		02/24/09		02/25/09		02/25	5/09
			QC Code	FS FS		FS		FS		FS	3		
		Lab Sample	Delivery Group	360-213	360-21354-1 360-21354-1 3		360-21	330-1	360-213	354-1	360-21	354-1	
Frac	Method	Analyte	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	14000		100	U	100	U	7.7	J	18	J
F	SW6010	Chromium	ug/l	940		4.3	J	4.9	J	5.5		6.6	
Ν	E300	Chloride	mg/l	300 .	J	50	J	39 .	J	22 、	J	170	J
Ν	E300	Sulfate	mg/l	2000		500		140		620		1100	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	360 99		43		94		190			
Ν	SM2510B	LAB SPECIFIC CONDUCTAL	NCI umhos/cm	5100		1400		650		1340		3200	

Notes:

N = normal

F = filtered

FS = field sample

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

Table 2

Final Results Summary - 360-21330 & 360-21354 February 2009 Slurry Wall / Cap Groundwater and Surface Water Olin Chemical Superfund Site Wilmington, Massachusetts

			Loc Name	PZ-17	RR	PZ-1	8R
			Field Sample ID	OC-PZ-17RR		OC-PZ-18R	
		F	ield Sample Date	02/25/09		02/25/09	
			QC Code	FS		FS	
		Lab Samp	le Delivery Group	360-213	354-1	360-21	354-1
Frac	Method	Analyte	Units	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	4.6 J		4.6	J
F	SW6010	Chromium	ug/l	2.9 J	l	15	
N	E300	Chloride	mg/l	17 J	Ì	130	J
N	E300	Sulfate	mg/l	510		220	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	75		76	
Ν	SM2510B	LAB SPECIFIC CONDUCT	ANCI umhos/cm	1400		1000	

Prepared by / Date: KJC 05/26/09

Checked by / Date: WDC 05/27/09

Notes:

N = normal

F = filtered

FS = field sample

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

Table 2 Final Results Summary - 360-21330 & 360-21354 February 2009 Slurry Wall / Cap Groundwater and Surface Water Olin Chemical Superfund Site Wilmington, Massachusetts

			Loc Name	ISCO	D1	ISC	02	ISCO)3	PZ-16	SRR	PZ-1	7RR
		Fie	eld Sample ID	OC-ISO	CO-1	OC-IS	CO-2	OC-ISO	CO-3	OC-PZ-16	SRRSW	OC-PZ-1	7RRSW
		Field	Sample Date	02/24	/09	02/24	4/09	02/24	/09	02/24	/09	02/2	4/09
			QC Code	FS	;	FS	3	FS		FS	3	F	S
		Lab Sample Do	elivery Group	360-213	330-1	360-21	330-1	360-213	330-1	360-21	330-1	360-21	330-1
Frac	Method	Analyte	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	280		800		39 J		1300		2200	
F	SW6010	Chromium	ug/l	40		160		0.38 J		340		440	
F	SW6010	Sodium	ug/l	98000		100000		100000		120000		110000	
Ν	E300	Chloride	mg/l	140 J	J	120	J	200 J		150 、	J	140	J
N	E300	Nitrate as N	mg/l	0.4		0.81		1.1		0.49		0.48	
Ν	E300	Nitrite as N	mg/l	0.1 L	J	0.01	U	0.1 ل	J	0.1 l	J	0.1	U
Ν	E300	Sulfate	mg/l	94		210		53		240		240	
Ν	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	18		42		3.3		41		34	
Ν	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	730		900		820		1000		1000	
Т	SW6010	Aluminum	ug/l	350		1300		470		3000		3500	
Т	SW6010	Chromium	ug/l	44		250		4.3 J		740		880	
Т	SW6010	Sodium	ug/l	90000		91000		91000		110000		120000	

Notes:

N = normal

T = total (unfiltered)

F = filtered

FS = field sample

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

Table 2 Final Results Summary - 360-21330 & 360-21354 February 2009 Slurry Wall / Cap Groundwater and Surface Water Olin Chemical Superfund Site Wilmington, Massachusetts

			·	57.46		25	
			Loc Name	PZ-18	3R	SD-	17
		Fie	eld Sample ID	OC-PZ-18	BRSW	OC-SI	D-17
		Field	Sample Date	02/24/	09	02/24	/09
			QC Code	FS		FS	3
		Lab Sample D	elivery Group	360-213	30-1	360-213	330-1
Frac	Method	Analyte	Units	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	230		1500	
F	SW6010	Chromium	ug/l	36		390	
F	SW6010	Sodium	ug/l	100000		130000	
N	E300	Chloride	mg/l	150 J		160 .	J
N	E300	Nitrate as N	mg/l	0.41		0.45	
N	E300	Nitrite as N	mg/l	0.1 U	l	0.1 เ	J
N	E300	Sulfate	mg/l	91		240	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	17		37	
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	740		1100	
Т	SW6010	Aluminum	ug/l	370		3400	
Т	SW6010	Chromium	ug/l	47		870	
Т	SW6010	Sodium	ug/l	100000		120000	

Prepared by / Date: KJC 05/26/09

Checked by / Date: CSR 05/27/09

Notes:

N = normal

T = total (unfiltered)

F = filtered

FS = field sample

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

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ammonia, chloride

STANDARD OPERATING PROCEDURE AND CHECKLIST LEVEL I DATA QUALITY EVALUATION OLIN-WILMINGTON

WET CHEMISTRY PARAMETERS BY VARIOUS METHODS Nota 4

Chris alcand Lab Report # 3c 0 - 2(330-1 Project # 410 7 09 0016.12 Sr. Review/Date

Reviewer/Date

es." MADEP,	he QAPP does	
, Activiti	. Where tl	
for Sampling, Data Evaluation and Reporting	sis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does	
Guidelines	MADEP, cri	
e "MADEP QA/QC	Where not defined by	ved by the laboratory.
Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for Sampling, Data Evaluation and Reporting Activities." MADEP,	however, may not list QA/QC criteria for every chemical analysis. W	not define criteria. OA/OC requirements will default to limits employed by the laboratory.
4	h	П

	1000 THE TOHOWING ANALYSES WILL DE EVALUATED ACCOUNTING TO THE PARTY PARTY EVALUATION AND THE POSTULATION OF THE POSTULATION AND THE POSTULATION OF THE POSTULATION AND THE POSTULATION OF THE POSTULATION
	however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the property of th
	not define criteria, QA/QC requirements will default to limits employed by the laboratory.
1.0	Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the Check items received.	on: Was all of the	following provided	following provided in the laboratory report? Yes $[A]$ No $[A]$	Yes [N/A	Comments:
Name of Laboratory	☐ Address	Ed Project ID	Phone #	区 Sample identification – Field and Laboratory	n – Field and	Laboratory
Client Information:	Name	Address	☑ Client Contact	(IDs must be cross-referenced)	enced)	
ACTION: If no, contact lab for submission of missing or illegible information.	submission of mi	issing or illegible in	formation.			
1.2 Laboratory Report Certification Statement	Certification St	atement		Yes [No [N/A[_]	Comments:
Does the laboratory report include a completed Analytical Report Certification in the required format?	rt include a comp	oleted Analytical Rep	oort Certification in the r	equired format?		
ACTION: If no, contact lab for submission of missing certification or certification with correct format.	bmission of miss	ing certification or c	ertification with correct fo	ormat.		
1.3 Laboratory Case Narrative:	arrative:			Yes [] No []	N/A [_]	Comments:
A Narrative serves as an	ı exception report t	for the project and me	Narrative serves as an exception report for the project and method QA/QC performance.	☐ Narrative includes an Certification Statement.	es an explana ment.	ロ Narrative includes an explanation of each discrepancy Certification Statement.

on the

1.4 Chain of Custody (COC) copy present with all documentation completed?

ACTION: If no, contact lab for submission of missing or illegible information.

Comments:

Yes [No [] N/A []

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the original COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (Cooler Receipt Form): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

		Yes [No [N/A	Comments:	
国Sample temperature confirmed: must be Container type noted 国Condition obs	Sample temperature confirmed: must be $1^{\circ} - 10^{\circ}$ C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply). Container type noted Condition observed Prified (where applicable) Field and lab IDs cross referenced	n the same da Os cross refer	ıy as collect enced	ion, temperatu	rre requirement does 1	not apply).
ACTION: If no, contact lab for submissic 1.5.1 Were the correct Annmonia,—1 Liter polyethyle Oil & Grease—1 Liter glass/F	ACTION: If no, contact lab for submission of missing or incomplete documentation. 1.5.1 Were the correct bottles and preservatives used? Ammonia,—1 Liter polyethylene/H ₂ SO ₄ to pH<2,cool to 4°C Oil & Grease—1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C	Yes	\ \\\X	N/A [Comments:	
Alkalinity – 1 Liter polyethylene/cool to 4°C	ene/cool to 4°C					
Chloride, pH, sulfate, nitrate, nitrite 50 mL polyethy (Thioride, pH, sulfate, nitrate, nitrite 50 mL (Nitrate/nitrite - H2SO4 to pH<2, cool to 4°C)	Chemical Oxygen Demand – 50 mL polyethylene/H ₂ SO ₄ to pH<2,cool to 4°C Chloride, pH, sulfate, nitrate, nitrite 50 mL polyethylene/cool to 4°C Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C					
Organic Carbon – 500 mL am Sulfide – 50 mL polyethylene.	Organic Carbon – 500 mL amber glass bottle/HCl or H ₂ SO ₄ to pH<2,cool to 4°C Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C					
Phenolics - H ₂ SO ₄ to pH<2, cool to 4°C Specific conductance, TDS, TSS – 100	Phenolics - H ₂ SO ₄ to pH<2,cool to 4°C Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C					
ACTION: If no, inform senior container/volume (if applicable), qua temperature exceeds 10°C. Rejection	ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment					
1.5.2 Were all samples	Were all samples delivered to the laboratory without breakage?	Yes	No	N/A	Comments:	
1.5.3 Does the Cooler F sample receipt, c circumstances affe	Does the Cooler Receipt Form or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes	No [N/A []	Comments:	

WET CHEM.doc

WET CHEMISTRY PARAMETERS BY VARIOUS METHODS STANDARD OPERATING PROCEDURE AND CHECKLIST OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION

Comments:

N/A

No [

Yes | Z

1.6 Sample Results Section: Was the following information supplied in the laboratory report for each sample?

E Field Clean-	Field ID and Lab ID Clean-up method Matrix CTION: If no, contact la	Field ID and Lab ID	E Preparation method ons plete information.	Dilution Factor Date of preparation/extraction/digestion clession clession (soils must be reported in dry weight)	E Dilution Factor E M moisture or solids E Reportion Date of preparation/extraction/digestion clean-up and analysis, where applicable Units (soils must be reported in dry weight)	E Reporting limits e applicable
	1.7 QA/QC Informati for each sample batch?	1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch?	ion provided in the laborato	ry report Yes [Wo []	N/A [] Comments:	
Ň	区 Method blank results	LCS recoveries MS/MSD re	MS/MSD recoveries and RPDs [] La	Laboratory duplicate results (where applicable)	plicable)	
ACTI	ON: If no, contact la	ACTION: If no, contact lab for submission of missing or incomplete information.	plete information.			
2.0	Holding Times			Yes No LA	N/A Comments:	
ACTI judgm	Have any technical holdin 28 days = ammonia, Alkalinity = 14 days Nitrite nitrogen as N NOTE: List samples that e ACTION: If technical holding tin judgment used to qualify soils. 3.0 Laboratory Meth 3.1 Was the correct laborat	holding times, determined honia, chemical oxygen dedays as N = 48 hrs that exceed hold time wing times are exceeded q Method Aboratory method used?	I from date of collection to date of an lemand, chloride, organic carbon, oil Sulfide, TDS, TSS = 7 days Nitrate + Nitrite as N = 28 days th # of days exceeded on checklist ualify results (J). For water samples	As grease, specific conductance, to pH = analyze immediately that are grossly exceeded (>2X ho Yes [ng times are as follows: tal organic carbon and sulfate Nitrate nitrogen as N = 48 hrs ld time) reject (R) all non-detect res N/A [] Comments:	sults. Professional
ACTI	ON: If no, contact lal	ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.	hange compared to the reque	ested method. Contact senior chemis	st to inform Client of change or to requ	luest variance.

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ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.	et lab for justification. Consult senic	or chemist fo	or action nee	ded.	
4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs).	.2 for PQLs).	Yes [No	N/A []	Comments:
4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.	emistry parameters? Qualify data e result non-detect ''U'' at the	Yes	No.	N/A	Comments:
If the sample concentration is $> 5 \times \text{blank}$ value, no qualification is needed	cation is needed.				
ACTION: If any blank has positive results, list all the concentrations qualifiers.	list all the concentrations detected and flagging level (flagging level = $5 \times b$ lank value) on the checklist. List all	gging level =	= 5 × blank v	value) on the o	checklist. List all
5.0 <u>Laboratory Control Standards</u>					
5.1 Was a laboratory control standard (LCS) run with samples or less?	standard (LCS) run with each analytical batch of 20	Yes [No [N/A []	Comments:
ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.	is not available, use professional the batch.				
5.2 Is a LCS Summary Form present?		Yes [No	N/A	Comments:
ACTION: If no, contact lab for resubmission of missing data.					
5.3 Is any wet chemistry analyte LCS recovery outside the control limits?	e the control limits?	Yes []	No [L	N/A []	Comments:

affected samples and their

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WET CHEMISTRY PARAMETERS BY VARIOUS METHODS STANDARD OPERATING PROCEDURE AND CHECKLIST LEVEL I DATA QUALITY EVALUATION **OLIN-WILMINGTON**

LCS Limits:

Specific Conductivity * \Box = 80-120% Ammonia Nitrogen as N* \Box = 80-120% Nitrite Nitrogen as N** \Box = 80-120% pH* \Box = 98-102%				nit, qualify all positive and no-detect results			Comments:	Comments:	Comments:		Comments:	and are considered	.
Carbonate Alkalinity** $\square = 80-120\%$ Oil & Grease* $\square = 80-120\%$ Nitrate Nitrogen as N*** $\square = 80-120\%$ Sulfate (EPA 300.0)* $\square = 80-120\%$	□ Rec Limits=	□ Rec Limits =	ery limits for wet chemistry analyses.)	batch as (J). If recovery is below the lower lin		or task	iked. Yes \[\] No \[\] N/A \[\]	Yes [] No [] N/A []	oles per Yes [] No [] N/A [Yes No No NA Ld	were perlished estimated (3) and are consid	page 5
Bicarbonate Alkalinity** $\square = 80-120\%$ TDS** $\square = 80-120\%$ COD High* $\square = 80-120\%$ Chloride* $\square = 80-120\%$	%R =	%R =	(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.,	qualify all positive sample results within the , non-detect results are rejected (R).		requencies based on monthly, quarterly, ents for each set with the senior chemist.	s analyzed? List project samples that were spiked. any were specified.	m present? missing data.	Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?	matrix spike data is missing, call lab for resubmission.	3	1	
Alkalinity** $\square = 80-120\%$ Total Organic Carbon** $\square = 80-120\%$ COD Low* $\square = 80-120\%$ Hardness* $\square = 80-120\%$	Other parameter(list)	Other parameter(list)		ACTION : If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).	6.0 Matrix Spikes	Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.	6.1 Were project-specific MS/MSDs analyzed? List project ACTION: If no, contact senior chemist to see if any were specified.	6.2 Is the MS/MSD Recovery Form present? ACTION: If no, contact lab for resubmission of missing data.	6.3 Were matrix spikes analyzed matrix?	ACTION: If any matrix spike data is missing, call lab for resubmission.	10th The change ms/m so percust receivering	the lown Of Cinit. At	pitutiolly biaid bus. WET CHEM. doc

sample = Sample	
Spiked SR	
II.	
SSR	
Where:	
	ike added
100%	SA = Sp
×	
(SSR-SR)	
II	
%R SA	
NOTE:	

result result

MS/MSD Recovery Limits:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) $\square = 75-125\%$
Chloride*(SM 4500 CI) $\Box = 75-125\%$	Specific Conductivity * = NA	Total Organic Carbon* = NA	$TDS^{**} = NA$
Oil & Grease* = NA	COD Low* $\Box = 75-125\%$	COD High* $\Box = 75-125\%$	Nitrate Nitrogen as N** $\square = 75-125\%$
Nitrite Nitrogen as N^* $\square = 75-125\%$	Hardness* $\square = 75-125\%$	Sulfate (EPA 300.0)* $\square = 75-125\%$ pH* = NA	$_{5}$ pH* = NA TSS* = NA
Other parameter(list)	%R =	☐ Rec Limits =	nits =

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags. 2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

NOTE: RPD =
$$S - D$$
 x 100% Where S = MS result $(S + D)/2$ D = MSD result

MS/MSD RPD Limits:

RPD ≤20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?



WET CHEMISTRY PARAMETERS BY VARIOUS METHODS STANDARD OPERATING PROCEDURE AND CHECKLIST LEVEL I DATA QUALITY EVALUATION OLIN-WILMINGTON

<u>:</u>
as estimated (
that analyte
Il results for
, qualify a
greater than specified limits,
If the RPD is
ACTION:

pH*
$$\square = 3\%$$
 Specific Conductivity * $\square = 5\%$ TSS** $\square = 6\%$ TDS** $\square = 6\%$

Sampling Accuracy 8.0

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected. 8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

8.2 Do any rinsate blanks have positive results?

- Comments: N/A[__] Yes No V
- Comments: N/A [7

Yes []

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below. If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times b$ lank value, no qualification is needed.

NOTE: MADEP does not require the collection of rinsate blanks.

Field Duplicates 9.0

- Comments: N/A[Were field duplicate samples collected? Obtain a list of samples and their associated Yes [] No [L field duplicates.

Comments:

- N/A[Z]Yes [9.2 Were field duplicates collected per the required frequency?
- MADEP Option 3 (1 per 10) MADEP Option 1(1 per 20) QAPP/IRSWP
- Comments: N/A[No. Yes [__] 9.3 Was the RPD < 30% for waters < 50% for soils? Calculate the RPD for results and attach to this review.

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified?

Comments:

Yes [No [M N/A []

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

* lety to Maris spilles section 6.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007. Massachusetts Department of Environmental Protection (MADEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

Version 3, October 2008

OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date MMS (Licord, 5/12/09
St. Review/Date (MAS (Licord, 5/12/09
Lab Report # 260-2/354-/
Project # 410 7050016. 12

ammonia chloride solfeth

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for Sampling, Data Evaluation and Reporting Activities." MADEP, however, may not list DA/OC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does

	however, may not list QA/QC criteria for every chemical analysis. Where not between a various will default to limits employed by the laboratory.	criteria ior every _l uirements will de	cnemical analysis. v fault to limits employ	ricle not definited by two- red by the laboratory.	out, viittia wiii uciauit to t	ndis sonia		,
1.0	Laboratory Deliverable Requirements	uirements						
	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received.	: Was all of the	following provided ii	1 the laboratory report?	Yes [No [] N	N/A	Comments:	
	☑ Name of Laboratory	西 Address	Project ID	La Phone #	Sample identification – Field and Laboratory	Field and La	aboratory	
	Client Information:	T⊒ Name	☐ Address	☐ Client Contact	(IDs must be cross-referenced)	ed)		
ACT	ACTION: If no, contact lab for submission of missing or illegible information.	bmission of mis	sing or illegible inf	ormation.	`			
	1.2 Laboratory Report Certification Stateme	ertification Sta	tement		Nes [√ No [√] N	N/A[_]	Comments:	
	Does the laboratory report include a completed Analytical Report Certification in the required format?	include a compl	eted Analytical Rep	ort Certification in the re	equired format?			
ACTI	ACTION: If no, contact lab for submission of missing certification or certification with correct format.	nission of missir	ng certification or ce	rtification with correct fo	ormat.			
	1.3 Laboratory Case Narrative:	rative:			Yes [N/A [_]	Comments:	
	Namative serves as an ex	xception report fo	r the project and met	/ Narrative serves as an exception report for the project and method QA/QC performance.	☐ Narrative includes an	an explanati nt	D Narrative includes an explanation of each discrepancy on the Continuation Statement	the

ACTION: If no, contact lab for submission of missing or illegible information.

Yes [No [NA [1.4 Chain of Custody (COC) copy present with all documentation completed?

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the original COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (Cooler Receipt Form): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

	Yes [No []	N/A	Comments:	
Asample temperature confirmed: must be 1° - 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).	d on the same day as collect	ion, temperatu	re requirement d	loes not apply).
Container type noted Dondition observed D pH verified (where applicable) Lorield and lab IDs cross referenced	IDs cross referenced			
ACTION: If no, contact lab for submission of missing or incomplete documentation. 1.5.1 Were the correct bottles and preservatives used?	\	,		·
Ammonia,- 1 Liter polyethylene/H ₂ SO ₄ to pH<2,cool to 4°C	Yes V No	N/A	Comments:	
Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C				
Alkalinity – 1 Liter polyethylene/cool to 4°C				
Chemical Oxygen Demand – 50 mL polyethylene/H2SO4 to pH<2,cool to 4°C				
Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C				
Nitrate/nitrite - H2SO4 to pH<2, cool to 4°C				
Organic Carbon – 500 mL amber glass bottle/HCl or H ₂ SO ₄ to pH<2,cool to 4°C			•	
Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C				
Phenolics - H ₂ SO ₄ to pH<2,cool to 4°C				
Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C				

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

No Yes [7] Were all samples delivered to the laboratory without breakage? 1.5.2

Comments:

N/A[

Comments: N/A[No [Z Yes [] Does the Cooler Receipt Form or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? 1.5.3

WET CHEMISTRY PARAMETERS BY VARIOUS METHODS STANDARD OPERATING PROCEDURE AND CHECKLIST LEVEL I DATA QUALITY EVALUATION OLIN-WILMINGTON

1.6 Sample Results Section report for each sample?	1.6 Sample Results Section: Was the following information supplied in the laboratory report for each sample?	* laboratory Yes [No [] N/A [] Comments:
区 Field ID and Lab ID Id Clean-up method Id Matrix	☐ Date and time collected ☐ Analyst Initials ☐ Analysis method ☐ Preparation method ☐ Target analytes and concentrations	Date of preparation/extraction/digestion clean-up and analysis, where applicable Units (soils must be reported in dry weight)
ACTION: If no, contact la	ACTION: If no, contact lab for submission of missing or incomplete information.	
1.7 QA/QC Informati for each sample batch?	1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch?	atory report Yes [L/No[] N/A[] Comments:
√ Method blank results	国人CS recoveries 区 MS/MSD recoveries and RPDs 图	H. aboratory duplicate results (where applicable)
ACTION: If no, contact lai	ACTION: If no, contact lab for submission of missing or incomplete information.	
o 10 Holding Times		Yes [] No [M/A] Comments:

limits

N V No So Holding Times 2.0

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

pH = analyze immediately

Nitrate nitrogen as N = 48 hrs

Alkalinity = 14 days

Nitrite nitrogen as N = 48 hrs

Sulfide, TDS, TSS = 7 days

Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

Laboratory Method 3.0

Comments: No [] N/A []

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2	Are the practical quantitation	quantitation limits the same as those specified by the	Yes []	No [] N/A[] Comments: The Inbourboy reports: for specific conductivity (Immhos/cm) is loss
Note there defin may	Note: The MADEP QA/QC Guidelines do not yet list PQLs futherefore all criteria will default to values stipulated in the QAPP*, define criteria, QA/QC requirements default to limits employed may also apply.	Note: The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.	the th	that times of 3 ambes for. do regularly.
Amn	Ammonia* E=0.1 mg/ L	Alkalinity** $\square = 1 \text{ mg/L}$	Bicarbonate Alkalinity** $\square = 1 \text{ mg/L}$	1 mg/L Carbonate Alkalinity** $\square = 1$ mg/L
Nitra	Nitrate Nitrogen as $N^* \square = .05 \text{ mg/L}$	Nitrite Nitrogen as $N^* \square = .01 \text{ mg/L}$	Chloride* [1 mg/L	Hardness $*\Box = 2 \text{ mg/L}$
Spec	Spec. Cond.** X3 umhos/cm	Total Organic Carbon** $\square = 1 \text{ mg/L}$	Oil & Grease* $\square = 5.5 \text{ mg/L}$	Sulfate (EPA 300.0)* F= 2 mg/L
:00D): Low -20 mg/L	COD* High - 50 mg/L □	$TDS^* \square = 10 \text{ mg/L}$	$TSS* \square = 5 mg/L$
Hd	pH □ < 2 to > 12	Phenolic - 0.01 mg/L		
Othe	Other parameter(list)	PQL = D	☐ Source of PQL =	
Othe	Other parameter(list)	PQL =	Source of PQL =	
ACTION: If	no, evaluate change with respect to s	ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.	etc. If sample PQL is indeterminat	te, contact lab for explanation.
3.37	3.3 Are the appropriate parameter results present for each sample	present for each sample in the SDG?	Yes [No []]	N/A [] Comments:
ACTION: If	no, check Request for Analysis to ver	ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data	that it was sent, and contact lab for	r resubmission of the missing data
3.4 I	3.4 If dilutions were required, were dilution factors reported?	n factors reported?	Yes [No []]	N/A [] Comments:
ACTION: If	ACTION: If no, contact the lab for submission.			
4.0 <u>Met</u>	Method Blanks		Yes [No []	N/A [] Comments:
4.17 ACTION: IF	4.1 Are the Method Blank Summaries present? ACTION: If no, call the laboratory for submission of missing data.	sent? 1 of missing data.		
4.2	4.2 Was a method blank analyzed for each analysis batch of wet 20 or less?	ch analysis batch of wet chemistry field samples of	Yes [No [N/A [] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.	nior chemist fo	or action nee	ded.		
4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs).	Yes []	S S	N/A	Comments:	
4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.	Yes	S.	N/A	Comments:	
If the sample concentration is $> 5 \times \text{blank}$ value, no qualification is needed.					
ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.	lagging level =	= 5 × blank	value) on the c	hecklist. List all affectec	l samples and their
		-			
5.0 Laboratory Control Standards					
5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less?	Yes [A	No	N/A	Comments:	
ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.		\			
5.2 Is a LCS Summary Form present?	Yes []	No	N/A []	Comments:	
ACTION: If no, contact lab for resubmission of missing data.					
5.3 Is any wet chemistry analyte LCS recovery outside the control limits?	Yes	No [N/A	Comments:	

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LCS Limits:			
Alkalinity** $\Box = 80-120\%$ Total Organic Carbon** $\Box = 80-120\%$ COD Low* $\Box = 80-120\%$ Hardness* $\Box = 80-120\%$	Bicarbonate Alkalinity** $\Box = 80-120\%$ $TDS** \Box = 80-120\%$ $COD \ High* \Box = 80-120\%$ Chloride* $\Box Z = 80-120\%$	Carbonate Alkalinity** $\square = 80-120\%$ Oil & Grease* $\square = 80-120\%$ Nitrate Nitrogen as N** $\square = 80-120\%$ Sulfate (EPA 300.0)* $\square = 80-120\%$	Specific Conductivity * \Box = 80-120% Ammonia Nitrogen as N* \Box = 80-120% Nitrite Nitrogen as N** \Box = 80-120% pH* \Box = 98-102% TSS* NA
Other parameter(list)	%R =	□ Rec Limits=	
Other parameter(list)	%R=	□ Rec Limits =	
	(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)	ery limits for wet chemistry analyses.)	
ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results are rejected (R).	qualify all positive sample results within the non-detect results are rejected (R).	batch as (J). If recovery is below the lower lii	mit, qualify all positive and no-detect results
6.0 Matrix Spikes			
Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.	requencies based on monthly, quarterly, snts for each set with the senior chemist.	or task	
6.1 Were project-specific MS/MSDs analyzed? List p. ACTION: If no, contact senior chemist to see if any were specified.	Were project-specific MS/MSDs analyzed? List project samples that were spiked contact senior chemist to see if any were specified.		Comments: The labor
6.2 Is the MS/MSD Recovery Form present? ACTION: If no, contact lab for resubmission of missing data.	n present? missing data.	Yes LY NO NA NA C	ysis on sample '
6.3 Were matrix spikes analyzed at the required frequency of matrix?	at the required frequency of 1 per 20 samples per	oles per Yes [V No [] N/A []	Comments:
ACTION: If any matrix spike data is missing, call lab for resubmission. 6.4 Are any wet chemistry analyte spike recoveries outsid	matrix spike data is missing, call lab for resubmission. Are any wet chemistry analyte spike recoveries outside of the QC limits?		
The olderick MS/MSO parent recourses (to andleg) and less qualities estimet (3) and an onsideral potatroly biand qualities the true to the consideral potatroly biand sent the true to come of cimit of 75. The unspiked s	airs (to and leg) and less in considered potentially prival similarly being similarly	then the lover social land the transfer and concentration	N/A[] Comments: (+s for chlorish were cinit + + + +5. Lev. (+s for chlorish were ms/ms) percent recoveries (1 and - & e); s reater than four times the
Spiking concentration. No in WET CHEM. doc	Arthu actor repuired.	page 5	

WET CHEMISTRY PARAMETERS BY VARIOUS METHODS STANDARD OPERATING PROCEDURE AND CHECKLIST LEVEL I DATA QUALITY EVALUATION **OLIN-WILMINGTON**

ji	(SSR-SR) x 100%	W	Where: SSR = Spiked sample result SR = Sample result
V C	SA = Spike added		
MS/MSD Recovery Limits:			•
Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) $\angle X = 75-125\%$
Chloride*(SM 4500 CI) 1 75-125%	Specific Conductivity * = NA	Total Organic Carbon* = NA	$TDS^{**} = NA$
Oil & Grease* = NA	COD Low* $\Box = 75-125\%$	COD High* $\Box = 75-125\%$	Nitrate Nitrogen as N^* $\square = 75-125\%$
Nitrite Nitrogen as N** $\square = 75-125\%$	Hardness* $\square = 75-125\%$	Sulfate (EPA 300.0)* $[\text{F} = 75-125\% \text{ pH*} = \text{NA}]$	5% pH* = NA TSS* = NA
Other parameter(list)	%R =	□ Rec Limits =	imits =
* = Laboratory Limits **	** = Olin QAPP Limits (MADEP has not	(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)	for wet chemistry analyses.)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags. 2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

* = Laboratory Limits

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits? D = MSD result NOTE: RPD = $\frac{S - D}{(S + D)/2}$ x 100% Where S = MSD result D = MSD result evaluated, but no flags are applied.

Yes [] NO[] N/A[] Comments: The ammonia nsymid RPD (1957) is Just than the QC lint of 20. The unspiked, ammonia sample conambation is great than four times the spiking conambation to further action required.

Laboratory Duplicate 7.0

MS/MSD RPD Limits:

RPD <20

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

N/A[__] No

sults for that analyte as estimated (J).	
greater than specified limits, qualify all res	
ACTION: If the RPD is	

$$pH* \square = 3\%$$
 Specific Conductivity * $\square = 5\%$ TSS** $\square = 6\%$ TDS** $\square = 6\%$

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below. If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

NOTE: MADEP does not require the collection of rinsate blanks.

9.0 Field Duplicates

- Comments: N/A[] No Were field duplicate samples collected? Obtain a list of samples and their associated Yes field duplicates. 9.1
- Comments: N/A [\script] % Xes [MADEP Option 3 (1 per 10) [] 9.2 Were field duplicates collected per the required frequency? MADEP Option 1(1 per 20) QAPP/IRSWP
- Comments: NA[S]No Yes [9.3 Was the RPD \leq 30% for waters \leq 50% for soils? Calculate the RPD for results and attach to this review.

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ple results if the RPD exceeded.
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C

	Comments:
	N/A
\	No [
	Yes []
	Was any of the data qualified?

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July

Massachusetts Department of Environmental Protection (MADEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

Version 1.2, Nov 2002

1.0

STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7 LEVEL I DATA QUALITY EVALUATION OLIN-WILMINGTON

Reviewer/Date Leff While	2/10/08
Sr. Review/Date Ch n 5 / Cl cand 1	5/27/04
Lab Report # 360-21330-1	///
Project # 610709016, 12	

1.0	Laboratory Deliverable Requirements		
	1.1 Laboratory Information: Was all of t Check items received.	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes	[No [] N/A [] Comments:
	☑ Name of Laboratory ☑ Address Client Information:	☐ Project ID ☐ Phone # ☐ ☐ Address ☐ Client Contact	Sample identification – Field and Laboratory (IDs must be cross-referenced)
ACT	ACTION: If no, contact lab for submission of missing or illegible information.	missing or illegible information.	
	1.2 Laboratory Report Certification Statement		Yes [\(\sum \) No [] N/A [] Comments:
Does	the laboratory report include a completed	Does the laboratory report include a completed Analytical Report Certification in the required format?	at?
ACTI	ON: If no, contact lab for submission of m	ACTION: If no, contact lab for submission of missing certification or certification with correct format.	at.
	1.3 Laboratory Case Narrative:	Yes	Yes [No [] N/A [] Comments:
	E) Narrative serves as an exception r	Narrative serves as an exception report for the project and method QA/QC performance.	nce. ☐ Narrative includes an explanation of each discrepancy
			Certification Statement.

ACTION: If no, contact lab for submission of copy of completed COC.

NOTE: Olin receives and maintains the original COC.

Comments:

Yes \[\sum_\ No \[\] N/A \[\]

1.4 Chain of Custody (COC) copy present with all documentation completed

ACTION: If no, contact lab for submission of missing or illegible information.

STANDARD OPERATING PROCEDURE AND CHECKLIST LEVEL I DATA QUALITY EVALUATION - OPTION 1 ICP METALS BY METHOD 6010B/200.7 **OLIN CORPORATION**

1.5 Sample Receipt Information (Cooler Receipt Form present?): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory? EXample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply). EXAMPLE Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply). EXAMPLE Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply). EXAMPLE Sample Results are confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the samples of missing or incomplete documentation. 1.5.1 Were all samples delivered to the laboratory without breakage? Yes [Z] No [MA] N/A [MA] Comments: circumstances affecting the quality of the data? I.6. Sample Results Section: Was each of the following requirements supplied in the Yes [Z] No [MA] N/A [MA] Comments: laboratory report for each sample?

La Units (soils must be reported in dry weight) Preparation method ✓ Target analytes and concentrations ロ/Date and time collected た Analysis method E Field ID and Lab ID Clean-up method

Malyst Initials

ACTION: If no, contact lab for submission of missing or incomplete information.

Comments: No[] N/A[] 1.7 QA/QC Information: Was each of the following information supplied in the Yes [laboratory report for each sample batch?

LEVEL I DATA OUALITY EVALUATION - OPTION 1 **OLIN CORPORATION**

			STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7	OCEDURE ETHOD 601	AND CE 10B/200.	ECKLI	ST	
Method blank results	ank results	Z LCS recoveries	MS/MSD recoveries and RPDs [] L	/// Laboratory duplicate results (where applicable)	icate resul	ts (where a	pplicable)	
ACTION: If	no, contact la	tb for submission of 1	ACTION: If no, contact lab for submission of missing or incomplete information.					
2.0 Hold	Holding Times							
Have any tecl excee	technical holdin exceeded? Holdii water and soil.	ig times, determined ng time for metals is	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.		Yes [] I	No [N/A	Comments:
NOTE: List &	amples that e	NOTE: List samples that exceed hold time with	with # of days exceeded on checklist					
ACTION: If (UI).	technical ho	olding times are exce xceeded (2X holding	ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.	n-detects				
3.0 <u>Lab</u>	Laboratory Method	thod						
3.1	Was the	Was the correct laboratory method used?	/ method used?	Ye	Yes [No [[] oh	N/A	Comments:
	Water Digestio Soil Digestion Metals	uc	3005A or 3010A or 3020A 3050B 6010B or 200.7					
ACTION: compared and to requ	ACTION: If no, cor compared to the reques and to request variance.	ACTION: If no, contact laboratory compared to the requested method. Con and to request variance.	ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.	change change				

NOTE: Verify that the reported metals match the target list specified on the COC.

3.2

Are the practical gaantitation limits the same as those specified by the $Yes[\]$ No $\[\]$ N/A $\[\]$ Comments: $\[\]$ SOW $\[\]$ QAPP $\[\]$ Lab $\[\]$ MADEP

3 of 10

I EVEL I DATA OHALITY EVALHATION - OPTION 1 **OLIN CORPORATION**

STANDARD OPERATING PROCEDURE AND CH ICP METALS BY METHOD 6010B/200.7	ATING PROCEDURE AND CHECKLIST ALS BY METHOD 6010B/200.7	
ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.		
3.3 Are results present for each sample in the SDG?	Yes [No [] N/A [] Comments:	
ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data	t was sent, and contact lab for resubmission of the missing data	
3.4 If dilutions were required, were dilution factors reported?	Yes [No [] N/A [] Comments:	
ACTION: If no, contact the lab for submission.		
4.0 Method Blanks		
4.1 Is the Method Blank Summary present?	Yes [L] No [] N/A [] Comments:	
ACTION: If no, call the laboratory for submission of missing data.		
4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples?	Yes [] N/A [] Comments:	
ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.		
4.3 Is the method blank less than the PQLs for all target elements?	Voc f 1 No f NA f 1 Comments:	
NOTE: MADEP requires the method blank to be matrix matched and digested with the samples		
4.4 Do any method blanks have positive results for metals? Qualify data according to $_{\rm Yes}$ [the following:	Yes [] NO [] N/A [] Comments: Aluminum is re, street method blank (6.1 mg/L). An action Gini	٧ .
6010.doc (30.5 4) (4) (6) (6) (6)	tasqual at 5x the blank concurrents to associal entirements. For so, 14 for elescolved albuminon in sample. 40f10 oc. 60. 25 is the ten the action times and was	£

mon-defect (4) at the reporting Grant.

OLIN CORPORATION LEVEL I DATA QUALITY EVALUATION – OPTION 1 STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

Control Standard	IIII OI GIAIIMAI G
town,	LADOI ATOLY COL
_	1

th of 20 Yes [No [] N/A [] Comments:	ble, use	Yes [No [] N/A [] Comments:		Yes No No NA Comments:		
Was a laboratory control standard run with each analytical batch of 20 samples or less?	NOTE: A <u>full</u> target, second source LCS is required by MADEP. ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.	Is a LCS Summary Form present?	ACTION: If no, contact lab for resubmission of missing data.	Is the recovery of any analyte outside of MADEP control limits? MADEP	Sample Type % Rec	80-120
5.1	NOTE: A ACTION: profession	5.2	ACTION:	5.3	Sam	Water

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-

detect results are rejected (R).

within Lab generated limits

Comments:

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OLIN CORPORATION LEVEL I DATA QUALITY EVALUATION – OPTION 1 STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

Comments:	
N/A[_]	
No [
Yes	
ect samples that were	
List project sar	
collected?	
MS/MSDs	
Were project-specific	;
6.1 Were	STATES

ACTION: If no, contact senior chemist to see if any were specified.

NOTE: A <u>full</u> target, second source MS/MSD is required by MADEP. ACTION: If any matrix spike data are missing, call lab for resubmission.

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

Are any metal spike recoveries outside of the QC limits?

Comments:

Yes No No N/A X

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

OLIN CORPORATION LEVEL I DATA QUALITY EVALUATION – OPTION 1 STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7

NO	NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.		
AC and recc resu	ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).		
	6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits?	Yes [] No	N ₀
N N	NOTE: RPD = S-D x 100% Where: S = MS sample result $(S+D)/2$ D = MSD sample result		
NO eva	NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.		
AC (J).	ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).		
7.0	Laboratory Duplicate		
	7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Yes [] No Duplicate Sample Form present?	Yes [No

N/A [✓ Comments:

N/A [] Comments:

Yes \square No \square N/A \square Comments:

ACTION: If not analyzed, qualification is not needed. If data is missing, contact

laboratory for resubmission of report. Narrate non-compliance.

NOTE: MADEP refers to this sample as a "matrix duplicate".

7.2 Is the RPD between the result for the laboratory duplicate sample and the

result for the parent sample outside of the QA/QC limits?

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OAPP RPD	20	20	20	20
MADEP Laboratory Duplicate Sample RPD Criteria:	For aqueous results > $5x$ RL, RPD must be $\pm 20\%$	For aqueous results $< 5 \times RL$, RPD must be $\leq RL$	For soil/sediment results > $5x$ RL, RPD must be $\pm 35\%$	For soil/sediment results < $5x$ RL, RPD must be $\leq 2x$ RL

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

- N/A[Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of Ves [] No [] the associated samples from the senior chemist.
- **8.2** Do any rinsate blanks have positive results?

Yes No NA Ye Comments:

Comments:

NOTE: MADEP does not require the collection of rinsate blanks.

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated Yes field duplicates.

	9.2 Were field duplicates collected per the required frequency?	Yes []	No [Yes No N/A N	Comments:	
Š	SOW 🛚 QAPP (1 per 10) 🗖 MADEP Option 1 (1 per 20) 🗇 MADEP Option 3 (1 per 10) 🗇					
	9.3 Was the RPD \leq 50% for soils or waters? Calculate the RPD for all results and Yes $[$ No $[$ N/A $[$ M attach to this review.	Yes []	No	N/A [Comments:	
ACT	ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.	the RPD e	xceeds 509	%		
10.0	Special QA/QC					
	10.1 Were both total and dissolved metals analysis performed? If so, the Yes [] No [] N/A [] dissolved metal concentration should not exceed that of the total metal.	Yes []	Ces No I	N/A [_]	Comments:	9

ACTION: If results for both total and dissolved are $\ge 5x$ the PQL and the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL and the difference exceeds 2x the PQL, flag both results as estimated (J)

Yes [] No [] N/A [] Comments:

Dissolved makeds resolt and lessthm, or within 102 greets them the total makeds.

on Qualifiers
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of Validation
Application
10.0

Was any of the data qualified?

Comments	
N/A	
] %	
Yes	

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.
- MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

Version 1.2, Nov 2002

OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7

1.0	Laboratory Deliverable Requirements	Requirements						e e e e e e e e e e e e e e e e e e e	
	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes [1] Check items received.	ion: Was all of the	following provided in the	laboratory report?	Yes	No[] N/A[]	N/A []	Comments:	
	र्ज Name of Laboratory Client Information:	Address Name	☐ Project ID ☐ Address	Phone # El	<	Sample identification – Field and Laboratory (IDs must be cross-referenced)	on – Field an cross-referer	d Laboratory iced)	
ACT	ACTION: If no, contact lab for submission of missing or illegible information.	submission of mi	ssing or illegible inform	nation.					
	1.2 Laboratory Report Certification Statement	Certification Sta	itement		Yes [Yes [No [] N/A []	N/A [_]	Comments:	
Does	Does the laboratory report include a completed Analytical Report Certification in the required format?	le a completed An	alytical Report Certifica	lion in the required	format?				
ACT	ACTION: If no, contact lab for submission of missing certification or certification with correct format.	ubmission of miss	ing certification or certifi	cation with correct	format.	\	•		
	1.3 Laboratory Case Narrative:	Varrative:			Yes	No[]	NO[] N/A[]	Comments:	
	☐ Narrative serves as on the	an exception repo	Narrative serves as an exception report for the project and method QA/QC performance. the	ethod QA/QC perfc	ттапсе.	☐ Narra	ative includ	ロ Narrative includes an explanation of each discrepancy	ch discrepancy
	,						Certifical	Certification Statement.	
ACT	ACTION: If no, contact lab for submission of missing or illegible	ubmission of miss	ing or illegible information.	on.		***		·	

NOTE: Olin receives and maintains the original COC.

ACTION: If no, contact lab for submission of copy of completed COC.

1.4 Chain of Custody (COC) copy present with all documentation completed

Comments:

Yes [\(\sqrt{\lambda} \) No [\(\sqrt{\lambda} \) N/A [\(\sqrt{\lambda} \)

STANDARD OPERATING PROCEDURE AND CHECKLIST LEVEL I DATA QUALITY EVALUATION - OPTION 1 ICP METALS BY METHOD 6010B/200.7 **OLIN CORPORATION**

h of the following tasks complboratory? ture confirmed: must be 1° – 10° ture all sample condition obsert lab for submission of mission of ture all samples delivered with sample receipt, conditionstances affecting the circumstances affecting the ple Results Section: Was each sample?	er Receipt Form present?): Yes [No [] N/A [] Comments:	eted and recorded upon receipt of the sample(s)	Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply). Container type noted La sample condition observed La pH verified (where applicable) La Field and lab IDs cross referenced	sing or incomplete documentation.	to the laboratory without breakage? Yes [No [] N/A [] Comments:	Does the Cooler Receipt Form or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special Yes [] No [// N/A [] Comments: circumstances affecting the quality of the data?	th of the following requirements supplied in the $ { m Yes} [$
	1.5 Sample Receipt Information (Cooler Receipt Form present?):	Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?	Sample temperature confirmed: must be 1° – 10° C. (If samples were se Container type noted	ACTION: If no, contact lab for submission of missing or incomplete documentation.	1.5.1 Were all samples delivered to the laboratory without breakage?	1.5.2 Does the Cooler Receipt Form or Lab Narrativ with sample receipt, condition of the samples, and circumstances affecting the quality of the data?	Sample Results Section: Was each of the following requirements supplied in the laboratory report for each sample?

Z Target analytes and concentrations ☐ Analysis method 区 AField ID and Lab ID Clean-up method ID Matrix

✓ Date and time collected

☐ /Dilution Factor ☐ % moisture or solids ☐ Reporting limits
☐ Date of preparation/extraction/digestion clean-up and analysis, where applicable 6 % moisture or solids ☐ Units (soils must be reported in dry weight) Preparation method _ Z Apalyst Initials

ACTION: If no, contact lab for submission of missing or incomplete information.

Comments: No [] N/A [1.7 QA/QC Information: Was each of the following information supplied in the Yes [laboratory report for each sample batch?

LEVEL I DATA QUALITY EVALUATION – OPTION 1 STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7 OLIN CORPORATION

Z Z	Method blank results	ık results	LCS recoveries		EMS/MSD recoveries and RPDs	LA aboratory duplicate results (where applicable)	luplicate resi	ults (where a	pplicable)		
ACTI	ON: If no	o, contact la	ab for submission	of missing o	ACTION: If no, contact lab for submission of missing or incomplete information.						
2.0	Holdir	Holding Times									
Have	any techr exceed water a	r technical holdir exceeded? Holdii water and soil.	ng times, determi ing time for metals	ned from de is 180 days	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.		Yes	No [L	N/A	Comments:	
NOT	E: List san	mples that e	exceed hold time w	/ith## of day:	NOTE: List samples that exceed hold time with # of days exceeded on checklist						
ACT	ION: If to (UJ).]	echnical hc If grossly e	olding times are exxceeded (2X hold	xceeded, qui ing time) rej	ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.	nd non-detects					
3.0	Labor	Laboratory Method	ethod								
	3.1	Was th	Was the correct laboratory method used?	ory method	1 used?		Yes []	No	N/A	Comments:	
		Water I Soil Dig Metals	Water Digestion Soil Digestion Metals	3005A or 3010, 3050B 6010B or 200.7	3005A or 3010A or 3020A 3050B 6010B or 200.7						
AC cor anc	TION: npared to I to reque	ACTION: If no, con compared to the reques and to request variance.	ACTION: If no, contact laboratory to compared to the requested method. Contact and to request variance.	y to prov ontact sen	ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.	thod change ent of change					
	3.2	Are the	Are the practical guantitation SOW QAPP		limits the same as those specified by the □ Lab □ MADEP		Yes []	No [N/A	Comments:	
NC	TE: Verif	'y that the n	eported metals ma	itch the targ	NOTE: Verify that the reported metals match the target list specified on the COC.						

Yes [\(\sum \) No [] N/A [] Comments:
ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data
Yes [No [] N/A [] Comments:
Yes [] N/A [] Comments:
for each digestion Yes [
Ves [1 No [,] N/A [] Comments:
Yes [] No [] N/A[] Comments: Dissolud chroming (0.24 m/L) is rejected in the method blank. An
action timit was established at 5x the cheasing cone. (1.2 mg/ls) All objected cheasing results are specific than the action limit, no forther action
Yes Yes Yes Yes Yes Yes Yes

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

Porch	Lalidaid
+	2
Contro	
*********	abol atol y
T obo	

Yes [No [] N/A [] Comments:		Yes [\(\sum \) No [] N/A [] Comments:		Yes [] No [\(\sum \) N/A [] Comments:	
5.1 Was a laboratory control standard run with each analytical batch of 20 $_{\mathbf{Y}}$ samples or less?	NOTE: A full target, second source LCS is required by MADEP. ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.	5.2 Is a LCS Summary Form present?	ACTION: If no, contact lab for resubmission of missing data.	5.3 Is the recovery of any analyte outside of MADEP control limits? MADEP	Sample Type % Rec Water 80-120 Soil within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-

detect results are rejected (R).

Comments:

5 of 10

STANDARD OPERATING PROCEDURE AND CHECKLIST LEVEL I DATA QUALITY EVALUATION -- OPTION 1 ICP METALS BY METHOD 6010B/200.7 **OLIN CORPORATION**

Matrix Spikes 6.0

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

- Were project-specific MS/MSDs collected? List project samples that were Yes [No [] N/A [] Comments: The let perhand a spiked.

 Spiked.

 A SAMPAND and chromism and chromism and chromism as sent and chromism and chromism and chromism as sent and chromism. 6.1
 - ACTION: If no, contact senior chemist to see if any were specified.
- Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present? NOTE: A <u>full</u> target, second source MS/MSD is required by MADEP.

ACTION: If any matrix spike data are missing, call lab for resubmission.

Yes [No [] N/A [] Comments:

Were matrix spikes analyzed as indicated on the COC and project Yes [/ No [] N/A [] Comments: schedule? 6.3

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

Yes No No NA Comments: Are any metal spike recoveries outside of the QC limits?

QAPP			70-130 200.7	
			N/A	
	Sample Type	Water	Water	Soil

Where: SSR = Spiked sample result SR = Sample result SA = Spike added **NOTE**: $%R = (SSR-SR) \times 100\%$

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control	limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
Dail	udgme
MS/MS	ssional ji
or an	profe
ries f	Ose
ecove	sary.
the re	neces
e of	on is
y on	fication
f onl	nalif
E:	, no
NOT	limits

and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS results and non-detects (J).

An MSD ambysis was not be torned. Yes No No NA Comments: Where: S = MS sample result Are any RPDs for MS/MSD recoveries outside of the QC limits? D = MSD sample result x 100% S-D NOTE: RPD =_ 6.5

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects

0 Laboratory Duplicate

Comments: If so, is the Laboratory Yes $\lfloor \checkmark \rfloor$ No $\lfloor \rfloor$ NA $\lfloor \rfloor$ 7.1 Was a laboratory duplicate sample analyzed? Duplicate Sample Form present?

NOTE: MADEP refers to this sample as a "matrix duplicate".

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance. 7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits?

Yes [] No [J N/A [] Comments:

STANDARD OPERATING PROCEDURE AND CHECKLIST LEVEL I DATA QUALITY EVALUATION - OPTION 1 ICP METALS BY METHOD 6010B/200.7 **OLIN CORPORATION**

OAPP RPD	20	20	20	20
MADEP Laboratory Duplicate Sample RPD Criteria:	For aqueous results > $5 \times$ RL, RPD must be \pm 20%	For aqueous results $< 5 \times RL$, RPD must be $\leq RL$	For soil/sediment results > $5 \times$ RL, RPD must be $\pm 35\%$	For soil/sediment results < $5x$ RL, RPD must be $\leq 2x$ RL

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

N/A[_] Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of Yes [] No [the associated samples from the senior chemist.

Comments:

Yes No NA

Do any rinsate blanks have positive results?

NOTE: MADEP does not require the collection of rinsate blanks.

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times \text{blank}$ value, no qualification is needed.

Field Duplicates 9.0

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated Yes field duplicates.

8 of 10

STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7	6010B/20	CHECKL 00.7	181	
9.2 Were field duplicates collected per the required frequency?	Yes []	No [N/A [Yes [] No [] N/A [Comments:
SOW 🛚 QAPP (1 per 10) 🗂 MADEP Option 1 (1 per 20) 🗇 MADEP Option 3 (1 per 10) 🗁				
9.3 Was the RPD \leq 50% for soils or waters? Calculate the RPD for all results and Yes $[\ \]$ No $[\ \ \]$ Comments: attach to this review.	Yes []	N _o	N/A[3	Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

Comments: N/A No Z 10.1 Were both total and dissolved metals analysis performed? If so, the Yes dissolved metal concentration should not exceed that of the total metal.

concentration is 10% higher than the total, flag both results as estimated (J). If total and ACTION: If results for both total and dissolved are $\geq 5x$ the PQL and the dissolved dissolved concentrations are less than 5x the PQL and the difference exceeds 2x the PQL, flag both results as estimated (J)

OLIN CORPORATION

LEVEL I DATA QUALITY EVALUATION – OPTION 1 STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7		Yes No Ki N/A
LEN	10.0 Application of Validation Qualifiers	Was any of the data qualified?
	10.0	

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

Comments:

REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.
- MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.



FILE COPY

ANALYTICAL REPORT

Job Number: 360-21330-1

Job Description: Slurry Wall/Cap

For:

Olin Corporation 3855 North Ocoee Street Suite 200

Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

CHECKED FOR COMPLETENESS
OF PARAMETERS ORDERED BY:

Joseph a. Cheur J.

Approved for release.

Joe Chimi

Report Production Representative

3/6/09 8:49 AM

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
03/06/2009

The test results in this report meet all NELAP requirements for accredited parameters. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced except in full, and with written approval from the laboratory.

TestAmerica Westfield Certifications and Approvals: MADEP MA014, RIDOH57, CTDPH 0494, VT DECWSD, NH DES 2539, NELAP FL E87912 TOX, NELAP NJ MA008 TOX, NELAP NY 10843, NY DOH 10843.

Field sampling is performed under SOPs WE-FLD-001 and WE-FLD-002



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		P MCP Ana		-				04000	4
Laborator	<u>, </u>	TestAmerica				ect #:	360-2	21330	-1
Project Lo		Slurry Wall/C	•	(PIC ())	MADEP F				
This form 360-2133		cations for the fol	lowing data so	et:[list Laboratory	Sample ID Nun	nber(s)]			
Sample M		Groundwater		Sediment	Drinking Water			011	()
MCP SW		8260B() 8270C()	8151A () 8081A ()	8330 () VPH ()	6010B (x)	7470A/1A 9014M ² /9	` ,	Othe	r ()
Methods	ed in MADEP	8082 ()	8021B ()	EPH()	7000 S ³ ()	7196A ()	. ,		
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	Methods.		•	or MADEP Phys		ble Cyanid	e (PAC)	Metho	d
(check all	that apply)	3 S - SW-846 N	Methods 7000	Series List indi	vidual method ar	nd analyte.			
An aff	irmative respo	nse to question	s A, B, C and	d D is required f	or "Presumptiv	e Certaint	y" statu	ıs	
Α	Were all sam	oles received by t	he laboratory	in a condition co	nsistent with		Yes		No ¹
		on the Chain-of-	•				\checkmark		
	Were all QA/0	Were all QA/QC procedures required for the specified analytical method(s)					Yes		No ¹
В		s report followed	•		, ,		√		
		arrative QC data	•	•					
	standards or g	guidelines?							
	Does the anal	ytical data includ	ed in this repo	ort meet all the re	equirements		Yes	N/A	No ¹
С		ive Certainty", as	•		•	f	√	,, .	
	•	ocument CAM VI		. ,					
		lines for the Acqu	•		•				
	VPH and EPH	I methods only:	Was the VPH	or FPH Method	I conducted with	out	Yes	N/A	No ¹
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		,		·	,				
	A respon	se to questions	E and F belo	w is required fo	or "Presumptive	e Certainty	" status	s	
Е	Were all QC p	erformance stan	dards and red	commendations f	or the		Yes		No ¹
	specified met	nods achieved?					$\sqrt{}$		
F	Were results	for all analyte-list	compounds/e	elements for the	specified		Yes	N/A	No ¹
	method(s) rep	orted?							$\sqrt{}$
	¹ All Negative	responses must l	oe addressed	in an attached E	nvironmental La	boratory c	ase narr	ative.	
, the und	ersigned, atte	st under the pair	ns and penal	ties of perjury t	hat, based upo	n my pers	onal		
nquiry of	f those respon	sible for obtaini	ng the inforn	nation, the mate	erial contained	in this			
analytica	l report is, to t	ne best of my kr	nowledge and	d belief, accurat	e and complete).			
	Signature:	Christone	Lucinete	RupoHS	Position:	Quality A	ssuran	ce Mar	nager
	Printed Name	Christine Reyr	nolds		Date:		3/6/09	8:38	
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TestA	merica		IELAP NJ MA008 TO	•	53 Southampton Rd,				
THE LEADER IN	ENVIRONMENTAL TESTING		IELAP NY 10843 IH DES 253901-A	OSEC IN ACCORDING	Westfield, MA 01085 Tel:(413)572-4000				
		VT DECWSD	DEG 233901-A	nelad	Fax:(413)572-3707				

WI-QA-037

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ethods		8270C()	8081A ()	VPH()	6020 ()	9014M ² /9	` '		
•	ed in MADEP	8082 ()	8021B ()	EPH()	7000 S ³ ()	7196A ()		
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•	Methods. that apply)	2 M - SW-846 M 3 S - SW-846 M						ivietno	a
	,	onse to questions						ıs	
Α		ples received by the					Yes		No ¹
^		d on the Chain-of-	•				√ √		140
		Were all QA/QC procedures required for the specified analytical method(s)				Yes		No ¹	
В		is report followed,	•	•			V		
		arrative QC data t	that did not me	et appropriate p	erformance				
	standards or	guidelines?							
	Does the ana	lytical data include	ed in this report	meet all the re	quirements		Yes	N/A	No ¹
С	for "Presumpt	tive Certainty", as	described in S	ection 2.0 (a), (I	b), (c) and (d) o	f		$\sqrt{}$	
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	3	(222			,				
	A respon	se to questions	E and F below	is required fo	r "Presumptive	e Certaint	y" status	3	
E	Were all QC	performance stand	dards and reco	mmendations fo	or the		Yes		No ¹
	specified met	hods achieved?					$\sqrt{}$		
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alytical	report is, to t	he best of my kn	owledge and	belief, accurate	e and complete	9.			
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E LEADER IN	ENVIRONMENTAL TESTING		ELAP NY 10843 H DES 253901-A	STED IN ACCORDAN	Westfield, MA 01085 Tel:(413)572-4000				
		VT DECWED		neba	Fav:(413)572-3707				

CASE NARRATIVE

Client: Olin Corporation

Project: Slurry Wall/Cap

Report Number: 360-21330-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues as stipulated in the MCP reporting requirements.

In order to facilitate report review, a separate MCP Analytical Method Report Certification Form is included for each method requested.

It should be noted that samples with elevated Reporting Limits (RLs) as a result of a dilution may not be able to satisfy "MCP program" reporting limits in some cases if the "adjusted" RL is greater than the applicable MCP standards or criterion to which the concentration is being compared. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes which exceed the calibration range.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

The samples were received on 02/24/2009; the samples arrived in good condition, properly preserved and on ice. The temperatures of the coolers at receipt were 4.0 and 5.0°C.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC and MADEP standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

MCP regulatory standard criteria were not specified for this report. Therefore, method reporting limits (RLs) were not assessed against any MCP standards as it may pertain to Question "E" on the Presumptive Certainty Certification Form (MADEP reference: WSC-CAM-AN-093008 - WSC-CAM Analytical Notes).

DISSOLVED METALS

Samples 360-21330-1 through 360-21330-8 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 02/25/2009.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

TOTAL METALS

Samples 360-21330-1 through 360-21330-7 were analyzed for total metals in accordance with EPA SW846 Method 6010B. The samples were prepared and analyzed on 02/25/2009.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:

Aluminum was detected in method blank MB 360-41607/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

The following reported methods not listed in the MADEP Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM), pursuant to the provisions of 310 CMR 40.0017(2).

ANIONS

Samples 360-21330-1 through 360-21330-8 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 02/25/2009.

All QC performance standards and recommendations for this specific method were achieved.

Samples 360-21330-1 through 360-21330-8(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration. For some samples, Nitrite is reported at a 10X dilution due to the high Chloride concentration.

AMMONIA

Samples 360-21330-1 through 360-21330-8 were analyzed for ammonia in accordance with LACHAT 107-06-1B. The samples were prepared on 03/03/2009 and analyzed on 03/04/2009.

All QC performance standards and recommendations for this specific method were achieved.

Samples 360-21330-2 through 360-21330-5(5X) and 360-21330-8(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-21330-1 through 360-21330-8 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 02/25/2009.

All QC performance standards and recommendations for this specific method were achieved.

This case narrative is available in Word format upon request.

METHOD SUMMARY

Client: Olin Corporation Job Number: 360-21330-1

Description	Lab Location	Method Preparation Met	hod
Matrix: Water			
Dissolved Metals	TAL WFD	SW846 6010B	
Total Metals Sample Filtration, Field Preparation, Total Metals	TAL WFD TAL WFD TAL WFD	SW846 6010B FIELD_FLTRD SW846 3010A	
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Nitrate & Nitrite	TAL WFD	40CFR136A 300.0	
Nitrogen Ammonia Distillation, Ammonia	TAL WFD TAL WFD	LACHAT L107-06-1B Distill/Ammonia	
Conductivity, Specific Conductance	TAL WFD	SM SM 2510B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Olin Corporation Job Number: 360-21330-1

Method	Analyst	Analyst ID
SW846 6010B	Nasiatka, Ellen M	EMN
40CFR136A 300.0	Lalashius, Andrew L	ALL
LACHAT L107-06-1B	Lalashius, Andrew L	ALL
SM SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation Job Number: 360-21330-1

Lab Sample ID Client Sample ID		Client Matrix	Date/Time Sampled	Date/Time Received
360-21330-1	OC-ISCO-3	Water	02/24/2009 0835	02/24/2009 1620
360-21330-2	OC-ISCO-2	Water	02/24/2009 0900	02/24/2009 1620
360-21330-3	OC-PZ-16RRSW	Water	02/24/2009 0905	02/24/2009 1620
360-21330-4	OC-PZ-17RRSW	Water	02/24/2009 0930	02/24/2009 1620
360-21330-5	OC-SD-17	Water	02/24/2009 0940	02/24/2009 1620
360-21330-6	OC-PZ-18RSW	Water	02/24/2009 0955	02/24/2009 1620
360-21330-7	OC-ISCO-1	Water	02/24/2009 1005	02/24/2009 1620
360-21330-8	OC-GW-25	Ground Water	02/24/2009 1330	02/24/2009 1620

SAMPLE RESULTS

Job Number: 360-21330-1

Client Sample ID: OC-ISCO-3 Lab Sample ID: 360-21330-1 Date Sampled: 02/24/2009 0835 Date Received: 02/24/2009 1620

Client Matrix: Water

Analyte	Result/Qu	alifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date A	nalyzed: 02	2/25/2009 1100	
Aluminum	39	J	ug/L	2.2	100	1.0
Chromium	0.38	J	ug/L	0.17	5.0	1.0
Sodium	100000		ug/L	65	2000	1.0
Method: 6010B			Date A	nalyzed: 02	2/25/2009 1349	
Prep Method: 3010A				•	2/25/2009 0747	
Aluminum	470	-B	ug/L	2.2	100	1.0
Chromium	4.3	J	ug/L	0.17	5.0	1.0
Sodium	91000		ug/L	65	2000	1.0

Mahlelle 5/0/09

Job Number: 360-21330-1

Client Sample ID: OC-ISCO-3 Lab Sample ID: 360-21330-1 Date Sampled: 02/24/2009 0835 Date Received: 02/24/2009 1620

Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Ana	nlyzed: 02/2	5/2009 1740	
Sulfate	53	mg/L	2.0	2.0	1.0
Nitrate as N	1.1	mg/L	0.050	0.050	1.0
Method: 300.0		Date Ana	ılyzed: 02/2	5/2009 1755	
Chloride	200 🖰	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B		Date Ana	ilyzed: 03/0	4/2009 1719	
Prep Method: Distill/Ammonia		Date Pre	•	3/2009 1320	
Ammonia	3.3	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Ana	ilyzed: 02/2	5/2009 1028	
Specific Conductance	820	umhos/cm	1.0	1.0	1.0

follow s/19/01

Job Number: 360-21330-1

Client Sample ID: OC-ISCO-2 Lab Sample ID: 360-21330-2 Date Sampled: 02/24/2009 0900 Date Received: 02/24/2009 1620

Client Matrix: Water

Maplalla stretog

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date A	nalyzed:	02/25/2009 1102	
Aluminum	800	ug/L	2.2	100	1.0
Chromium	160	ug/L	0.17	5.0	1.0
Sodium	100000	ug/L	65	2000	1.0
Method: 6010B		Date A	nalyzed:	02/25/2009 1353	
Prep Method: 3010A		Date P	repared:	02/25/2009 0747	
Aluminum	1300 Æ	ug/L	2.2	100	1.0
Chromium	250	ug/L	0.17	5.0	1.0
Sodium	91000	ug/L	65	2000	1.0

Client Sample ID: OC-ISCO-2 Lab Sample ID: 360-21330-2 Date Sampled: 02/24/2009 0900 Date Received: 02/24/2009 1620

Job Number: 360-21330-1

Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Ana	ılyzed: 0	2/25/2009 1810	
Nitrate as N	0.81	mg/L	0.050	0.050	1.0
Nitrite as N	ND	mg/L	0.010	0.010	1.0
Method: 300.0		Date Ana	ılyzed: 0	2/25/2009 1825	
Sulfate	210	mg/L	20	20	10
Chloride	120 3	mg/L	10	10	10
Method: L107-06-1B		Date Ana	ılyzed: 0	3/04/2009 1733	
Prep Method: Distill/Ammonia		Date Pre	pared: 0	3/03/2009 1320	
Ammonia	42	mg/L	0.50	0.50	5.0
Method: SM 2510B		Date Ana	ılyzed: 0	2/25/2009 1029	
Specific Conductance	900	umhos/cm	1.0	1.0	1.0

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Job Number: 360-21330-1

Client Sample ID: OC-PZ-16RRSW Lab Sample ID: 360-21330-3

Date Sampled: 02/24/2009 0905 Date Received: 02/24/2009 1620

Maphalila 5/18/09

Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date A	nalyzed:	02/25/2009 1105	
Aluminum	1300	ug/L	2.2	100	1.0
Chromium	340	ug/L	0.17	5.0	1.0
Sodium	120000	ug/L	65	2000	1.0
Method: 6010B		Date A	nalyzed:	02/25/2009 1356	
Prep Method: 3010A		Date P	repared:	02/25/2009 0747	
Aluminum	3000	ug/L	2.2	100	1.0
Chromium	740	ug/L	0.17	5.0	1.0
Sodium	110000	ug/L	65	2000	1.0

Job Number: 360-21330-1

Client Sample ID: OC-PZ-16RRSW Lab Sample ID: 360-21330-3

Date Sampled: 02/24/2009 0905 Date Received: 02/24/2009 1620

Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Ana	lyzed:	02/25/2009 1841	
Nitrate as N	0.49	mg/L	0.05	0 0.050	1.0
Method: 300.0		Date Ana	lyzed:	02/25/2009 1856	
Sulfate	240	mg/L	20	20	10
Chloride	150 J	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B		Date Ana	lyzed:	03/04/2009 1734	
Prep Method: Distill/Ammonia		Date Pres	pared:	03/03/2009 1320	
Ammonia	41	mg/L	0.50	0.50	5.0
Method: SM 2510B		Date Ana	lvzed:	02/25/2009 1031	
Specific Conductance	1000	umhos/cm	1.0	1.0	1.0

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Job Number: 360-21330-1

Client Sample ID: OC-PZ-17RRSW Lab Sample ID: 360-21330-4

Date Sampled: 02/24/2009 0930 Date Received: 02/24/2009 1620

Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date A	nalyzed: 0	2/25/2009 1108	
Aluminum	2200	ug/L	2.2	100	1.0
Chromium	440	ug/L	0.17	5.0	1.0
Sodium	110000	ug/L	65	2000	1.0
Method: 6010B		Date A	nalyzed: 02	2/25/2009 1404	
Prep Method: 3010A		Date P	repared: 02	2/25/2009 0747	
Aluminum	3500	ug/L	2.2	100	1.0
Chromium	880	ug/L	0.17	5.0	1.0
Sodium	120000	ug/L	65	2000	1.0

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Client Sample ID: OC-PZ-17RRSW Lab Sample ID: 360-21330-4

Date Sampled: 02/24/2009 0930 Date Received: 02/24/2009 1620

Job Number: 360-21330-1

Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Ana	ılyzed: (02/25/2009 1941	
Nitrate as N	0.48	mg/L	0.050	0.050	1.0
Method: 300.0		Date Ana	lyzed: (02/25/2009 1956	
Sulfate	240	mg/L	20	20	10
Chloride	140 3	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B		Date Ana	lyzed: (03/04/2009 1735	
Prep Method: Distill/Ammonia		Date Prep	oared: (03/03/2009 1320	
Ammonia	34	mg/L	0.50	0.50	5.0
Method: SM 2510B		Date Ana	lyzed: (02/25/2009 1032	
Specific Conductance	1000	umhos/cm	1.0	1.0	1.0

1/1/1/ alla 5/19/09

Client Sample ID: OC-SD-17 Lab Sample ID: 360-21330-5 Date Sampled: 02/24/2009 0940 Date Received: 02/24/2009 1620

Job Number: 360-21330-1

Client Matrix: Water

	Date A	nalyzed: 02/2	5/2009 1111	
1500	ug/L	2.2	100	1.0
390	ug/L	0.17	5.0	1.0
130000	ug/L	65	2000	1.0
	Date A	nalyzed: 02/2	5/2009 1407	
			5/2009 0747	
3400		2.2	100	1.0
870	ug/L	0.17	5.0	1.0
120000	ug/L	65	2000	1.0
	390 130000 3400 870	1500 ug/L 390 ug/L 130000 ug/L Date A Date P 3400 pg/L 870 ug/L	1500 ug/L 2.2 390 ug/L 0.17 130000 ug/L 65 Date Analyzed: 02/2: Date Prepared: 02/2: 3400 B ug/L 2.2 870 ug/L 0.17	1500 ug/L 2.2 100 390 ug/L 0.17 5.0 130000 ug/L 65 2000 Date Analyzed: 02/25/2009 1407 Date Prepared: 02/25/2009 0747 3400 B ug/L 2.2 100 870 ug/L 0.17 5.0

Job Number: 360-21330-1

Client Sample ID: OC-SD-17 Lab Sample ID: 360-21330-5 Date Sampled: 02/24/2009 0940 Date Received: 02/24/2009 1620

Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Ana	alyzed:	02/25/2009 2011	
Nitrate as N	0.45	mg/L	0.05	0.050	1.0
Method: 300.0		Date Ana	alyzed:	02/25/2009 2026	
Sulfate	240	mg/L	20	20	10
Chloride	160 °J	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B		Date Ana	ılyzed:	03/04/2009 1738	
Prep Method: Distill/Ammonia		Date Pre	pared:	03/03/2009 1320	
Ammonia	37	mg/L	0.50	0.50	5.0
Method: SM 2510B		Date Ana	ılyzed:	02/25/2009 1034	
Specific Conductance	1100	umhos/cm	1.0	1.0	1.0

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Client Sample ID: OC-PZ-18RSW Lab Sample ID: 360-21330-6

Date Sampled: 02/24/2009 0955 Date Received: 02/24/2009 1620

Job Number: 360-21330-1

Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date A	nalyzed:	02/25/2009 1114	
Aluminum	230	ug/L	2.2	100	1.0
Chromium	36	ug/L	0.17	5.0	1.0
Sodium	100000	ug/L	65	2000	1.0
Method: 6010B Prep Method: 3010A			•	02/25/2009 1410 02/25/2009 0747	
Aluminum	370	ug/L	2.2	100	1.0
Chromium	47	ug/L	0.17	5.0	1.0
Sodium	100000	ug/L	65	2000	1.0
		jet A	JS beli	Lo 5/12/09	

Job Number: 360-21330-1

Client Sample ID: OC-PZ-18RSW Lab Sample ID: 360-21330-6

Date Sampled: 02/24/2009 0955 Date Received: 02/24/2009 1620

Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Ana	llyzed: 02/2	25/2009 2041	
Sulfate	91	mg/L	2.0	2.0	1.0
Nitrate as N	0.41	mg/L	0.050	0.050	1.0
Method: 300.0	_	Date Ana	lvzed: 02/2	25/2009 2056	
Chloride	150 ブ	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B		Date Ana	lvzed: 03/0	04/2009 1725	
Prep Method: Distill/Ammonia		Date Pre	oared: 03/0	3/2009 1320	
Ammonia	17	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Ana	lvzed: 02/2	25/2009 1035	
Specific Conductance	740	umhos/cm	1.0	1.0	1.0

May Clile Shales

Client Sample ID: OC-ISCO-1 Lab Sample ID: 360-21330-7 Date Sampled: 02/24/2009 1005 Date Received: 02/24/2009 1620

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Job Number: 360-21330-1

Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date A	nalyzed: 02/	25/2009 1123	
Aluminum	280	ug/L	2.2	100	1.0
Chromium	40	ug/L	0.17	5.0	1.0
Sodium	98000	ug/L	65	2000	1.0
Method: 6010B		Date A	nalyzed: 02/	25/2009 1413	
Prep Method: 3010A		Date P	repared: 02/	25/2009 0747	
Aluminum	350	ug/L	2.2	100	1.0
Chromium	44	ug/L	0.17	5.0	1.0
Sodium	90000	ug/L	65	2000	1.0

Client Sample ID: OC-ISCO-1 Lab Sample ID: 360-21330-7 Date Sampled: 02/24/2009 1005 Date Received: 02/24/2009 1620

Job Number: 360-21330-1

Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Ana	lyzed: 02/2	5/2009 2111	
Sulfate	94	mg/L	2.0	2.0	1.0
Nitrate as N	0.40	mg/L	0.050	0.050	1.0
Method: 300.0		Date Ana	lvzed: 02/2	5/2009 2126	
Chloride	140 ゴ	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B		Date Ana	lvzed: 03/0	4/2009 1726	
Prep Method: Distill/Ammonia		Date Prep	-	3/2009 1320	
Ammonia	18	mg/L	0.10	0.10	1.0
Method: SM 2510B		Date Ana	lvzed: 02/2	5/2009 1037	
Specific Conductance	730	umhos/cm	1.0	1.0	1.0

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Job Number: 360-21330-1

Client Sample ID: OC-GW-25 Lab Sample ID: 360-21330-8 Date Sampled: 02/24/2009 1330
Date Received: 02/24/2009 1620
Client Matrix: Ground Water

Analyte	Result/Qua	alifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B	100	u	Date A	nalyzed: 0	2/25/2009 1126	
Aluminum	7-4		ug/L	2.2	100	1.0
Chromium	4.9	J	ug/L	0.17	5.0	1.0

MAMILLE Sheep

Client Sample ID: OC-GW-25 Lab Sample ID: 360-21330-8 Date Sampled: 02/24/2009 1330
Date Received: 02/24/2009 1620
Client Matrix: Ground Water

Job Number: 360-21330-1

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Ana	ılyzed:	02/25/2009 2157	
Sulfate	140	mg/L	20	20	10
Chloride	39 3	mg/L	10	10	10
Method: L107-06-1B		Date Ana	lyzed:	03/04/2009 1739	
Prep Method: Distill/Ammonia		Date Pre	pared:	03/03/2009 1320	
Ammonia	43	mg/L	1.0	1.0	10
Method: SM 2510B		Date Ana	lyzed:	02/25/2009 1038	
Specific Conductance	650	umhos/cm	1.0	1.0	1.0

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DATA REPORTING QUALIFIERS

Client: Olin Corporation Job Number: 360-21330-1

Lab Section	Qualifier	Description
Metals		
Woldio		
	В	Compound was found in the blank and sample.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

QUALITY CONTROL RESULTS

Client: Olin Corporation Job Number: 360-21330-1

QC Association Summary

Lab Camula ID	Client Commis ID	Report Basis	Client Metric	Mathad	Duan Batah
Lab Sample ID	Client Sample ID	Dasis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 360-41607					
LCS 360-41607/2-A	Lab Control Spike	Т	Water	3010A	
LCSD 360-41607/3-A	Lab Control Spike Duplicate	Т	Water	3010A	
MB 360-41607/1-A	Method Blank	Т	Water	3010A	
360-21330-1	OC-ISCO-3	Т	Water	3010A	
360-21330-2	OC-ISCO-2	Т	Water	3010A	
360-21330-3	OC-PZ-16RRSW	T	Water	3010A	
360-21330-4	OC-PZ-17RRSW	T	Water	3010A	
360-21330-5	OC-SD-17	T	Water	3010A	
360-21330-6	OC-PZ-18RSW	T	Water	3010A	
360-21330-7	OC-ISCO-1	Т	Water	3010A	
Analysis Batch:360-41	632				
LCS 360-41632/1	Lab Control Spike	Т	Water	6010B	
LCSD 360-41632/13	Lab Control Spike Duplicate	Ť	Water	6010B	
MB 360-41632/2	Method Blank	Ť	Water	6010B	
360-21330-1	OC-ISCO-3	D	Water	6010B	
360-21330-2	OC-ISCO-2	D	Water	6010B	
360-21330-3	OC-PZ-16RRSW	D	Water	6010B	
360-21330-4	OC-PZ-17RRSW	D	Water	6010B	
360-21330-5	OC-SD-17	D	Water	6010B	
360-21330-6	OC-PZ-18RSW	D	Water	6010B	
360-21330-7	OC-ISCO-1	D	Water	6010B	
360-21330-8	OC-GW-25	D	Water	6010B	
Analysis Batch:360-41		_		00405	000 44007
LCS 360-41607/2-A	Lab Control Spike	T	Water	6010B	360-41607
LCSD 360-41607/3-A	Lab Control Spike Duplicate	T	Water	6010B	360-41607
MB 360-41607/1-A	Method Blank	T -	Water	6010B	360-41607
360-21330-1	OC-ISCO-3	Т	Water	6010B	360-41607
360-21330-2	OC-ISCO-2	Т	Water	6010B	360-41607
360-21330-3	OC-PZ-16RRSW	Т	Water	6010B	360-41607
360-21330-4	OC-PZ-17RRSW	Т	Water	6010B	360-41607
360-21330-5	OC-SD-17	T	Water	6010B	360-41607
360-21330-6	OC-PZ-18RSW	T	Water	6010B	360-41607
360-21330-7	OC-ISCO-1	Т	Water	6010B	360-41607

Report Basis

D = Dissolved

T = Total

Client: Olin Corporation Job Number: 360-21330-1

QC Association Summary

		Report			
Lab Sample ID (Client Sample ID	Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-41620		_			
LCS 360-41620/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-41620/4	Method Blank	T	Water	SM 2510B	
360-21330-1	OC-ISCO-3	T	Water	SM 2510B	
360-21330-2	OC-ISCO-2	T	Water	SM 2510B	
360-21330-3	OC-PZ-16RRSW	T	Water	SM 2510B	
360-21330-4	OC-PZ-17RRSW	T	Water	SM 2510B	
360-21330-5	OC-SD-17	T	Water	SM 2510B	
360-21330-6	OC-PZ-18RSW	Т	Water	SM 2510B	
360-21330-7	OC-ISCO-1	T	Water	SM 2510B	
360-21330-8	OC-GW-25	Т	Water	SM 2510B	
Analysis Batch:360-41671					
LCS 360-41671/2	Lab Control Spike	T	Water	300.0	
MB 360-41671/1	Method Blank	Т	Water	300.0	
360-21330-1	OC-ISCO-3	Ť	Water	300.0	
360-21330-2	OC-ISCO-2	Ť	Water	300.0	
360-21330-3	OC-PZ-16RRSW	Ť	Water	300.0	
360-21330-4	OC-PZ-17RRSW	Ť	Water	300.0	
360-21330-5	OC-SD-17	Ť	Water	300.0	
360-21330-6	OC-PZ-18RSW	Ť	Water	300.0	
360-21330-7	OC-ISCO-1	T	Water	300.0	
		•		333.3	
Analysis Batch:360-41672					
LCS 360-41672/2	Lab Control Spike	T	Water	300.0	
MB 360-41672/1	Method Blank	T	Water	300.0	
360-21330-1	OC-ISCO-3	T	Water	300.0	
360-21330-2	OC-ISCO-2	T	Water	300.0	
360-21330-3	OC-PZ-16RRSW	Т	Water	300.0	
360-21330-4	OC-PZ-17RRSW	Т	Water	300.0	
360-21330-5	OC-SD-17	T	Water	300.0	
360-21330-6	OC-PZ-18RSW	T	Water	300.0	
360-21330-7	OC-ISCO-1	T	Water	300.0	
360-21330-8	OC-GW-25	T	Water	300.0	
Prep Batch: 360-41845					
LCS 360-41845/2-A	Lab Control Spike	Т	Water	Distill/Ammonia	
MB 360-41845/1-A	Method Blank	Ť	Water	Distill/Ammonia	
360-21330-1	OC-ISCO-3	† T	Water	Distill/Ammonia	
360-21330-2	OC-13CO-3 OC-1SCO-2	T T	Water	Distill/Ammonia	
	OC-13CO-2 OC-PZ-16RRSW	T T	Water	Distill/Ammonia	
360-21330-3 360-21330-4		T T		Distill/Ammonia	
	OC-PZ-17RRSW	T T	Water		
360-21330-5	OC-SD-17	T	Water	Distill/Ammonia	
360-21330-6	OC-PZ-18RSW		Water	Distill/Ammonia	
360-21330-7	OC-ISCO-1	T T	Water	Distill/Ammonia	
360-21330-8	OC-GW-25	T	Water	Distill/Ammonia	

Client: Olin Corporation Job Number: 360-21330-1

QC Association Summary

		Report			
Lab Sample ID	Client Sample ID	Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-41	1860				
LCS 360-41845/2-A	Lab Control Spike	T	Water	L107-06-1B	360-41845
MB 360-41845/1-A	Method Blank	Т	Water	L107-06-1B	360-41845
360-21330-1	OC-ISCO-3	Т	Water	L107-06-1B	360-41845
360-21330-2	OC-ISCO-2	Т	Water	L107-06-1B	360-41845
360-21330-3	OC-PZ-16RRSW	Т	Water	L107-06-1B	360-41845
360-21330-4	OC-PZ-17RRSW	Т	Water	L107-06-1B	360-41845
360-21330-5	OC-SD-17	Т	Water	L107-06-1B	360-41845
360-21330-6	OC-PZ-18RSW	Т	Water	L107-06-1B	360-41845
360-21330-7	OC-ISCO-1	Т	Water	L107-06-1B	360-41845
360-21330-8	OC-GW-25	Т	Water	L107-06-1B	360-41845

Report Basis

T = Total

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41607

Method: 6010B

Preparation: 3010A

Disso local

Lab Sample ID: MB 360-41607/1-A

Client Matrix: Water

1.0

Dilution: Date Analyzed: 02/25/2009 1303 Date Prepared: 02/25/2009 0747 Analysis Batch: 360-41641 Prep Batch: 360-41607

Units: ug/L

Instrument ID: Varian 720 ES ICP

Lab File ID: N/A

Initial Weight/Volume: 50 mL Final Weight/Volume: 50 mL

Analyte	Result	Qual	MDL	RL
Aluminum Chromium	6.1	J	2.2	100
Sodium	ND ND		0.17 65	5.0 2000

Lab Control Spike/

Lab Control Spike Duplicate Recovery Report - Batch: 360-41607

Method: 6010B Preparation: 3010A

LCS Lab Sample ID: LCS 360-41607/2-A

Client Matrix:

Water

Dilution:

Date Analyzed: Date Prepared:

1.0

02/25/2009 1306

02/25/2009 0747

Analysis Batch: 360-41641

Prep Batch: 360-41607

Units: ug/L

Instrument ID: Varian 720 ES ICP Lab File ID: N/A

Initial Weight/Volume:

50 mL

Final Weight/Volume:

50 mL

LCSD Lab Sample ID: LCSD 360-41607/3-A

Client Matrix:

Water

Dilution:

Date Analyzed:

1.0

Date Prepared:

02/25/2009 1309 02/25/2009 0747 Analysis Batch: 360-41641 Prep Batch: 360-41607

Units: ug/L

Instrument ID:

Varian 720 ES ICP

Lab File ID: N/A

Initial Weight/Volume: 50 mL

Final Weight/Volume: 50 mL

	<u>%</u>	Rec.			
Analyte	LCS	LCSD	Limit	RPD	RPD Limit LCS Qual LCSD Qual
Aluminum	98	101	80 - 120	3	
Chromium	99	102	80 - 120	3	20
Sodium	95	98	80 - 120	3	20

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41632

Method: 6010B Preparation: N/A

Lab Sample ID: MB 360-41632/2

Client Matrix: Dilution:

Water

1.0

Date Analyzed: 02/25/2009 1044

Date Prepared: N/A

Analysis Batch: 360-41632

Prep Batch: N/A

Units: ug/L

Instrument ID: Varian 720 ES ICP

Lab File ID: N/A Initial Weight/Volume:

Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		2.2	100
Chromium	ND		0.17	5.0
Sodium	ND		65	2000

Lab Control Spike/

Lab Control Spike Duplicate Recovery Report - Batch: 360-41632

Method: 6010B Preparation: N/A

LCS Lab Sample ID: LCS 360-41632/1

Client Matrix: Dilution:

Water 1.0

Date Analyzed:

02/25/2009 1041

Date Prepared:

N/A

Water

Client Matrix:

Date Analyzed:

Date Prepared:

N/A

Analysis Batch: 360-41632

Prep Batch: N/A

Units: ug/L

Instrument ID: Varian 720 ES ICP

Lab File ID: N/A Initial Weight/Volume:

Final Weight/Volume:

10 mL

LCSD Lab Sample ID: LCSD 360-41632/13

Dilution:

1.0

02/25/2009 1117

Analysis Batch: 360-41632

Prep Batch: N/A

0/ 10--

Units: ug/L

Instrument ID: Varian 720 ES ICP

Lab File ID: N/A Initial Weight/Volume:

Final Weight/Volume: 10 mL

Analyte	LCS	Kec. LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Aluminum Chromium Sodium	98 98 98	98 98 97/	80 - 120 80 - 120 80 - 120	O O 1	20 20 20 20	DP 4.55.2.330 · · · · · · · · · · · · · · · · · ·	ddammopologus vand reigigga i Julio dud 19

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41671

Method: 300.0 Preparation: N/A

Lab Sample ID: MB 360-41671/1

Client Matrix: Water

Dilution:

1.0

Date Analyzed: 02/25/2009 1609

Date Prepared: N/A

Analysis Batch: 360-41671

Prep Batch: N/A

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Nitrate as N	ND		0.050	0.050
Nitrite as N	ND		0.010	0.010

Lab Control Spike - Batch: 360-41671

Method: 300.0 Preparation: N/A

Lab Sample ID: LCS 360-41671/2

Client Matrix: Water

1.0

Dilution: Date Analyzed: 02/25/2009 1625

Date Prepared: N/A

Analysis Batch: 360-41671

Prep Batch: N/A

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	4.00	4.14	103	85 - 115	THE REPORT OF THE CONTROL AND ADDRESS AND
Nitrite as N	4.00	4.04	101 /	85 - 115	

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41672

Method: 300.0 Preparation: N/A

Lab Sample ID: MB 360-41672/1

Client Matrix: Water Dilution:

1.0

Date Analyzed: 02/25/2009 1609

Date Prepared: N/A

Analysis Batch: 360-41672

Prep Batch: N/A

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL	
Sulfate Chloride	ND ND	NATARANA ARITA PERMUNIKAN MANUNCAN MANU	2.0 1.0	2.0 1.0	

Lab Control Spike - Batch: 360-41672

Method: 300.0 Preparation: N/A

Lab Sample ID: LCS 360-41672/2

Client Matrix: Dilution:

Water 1.0

Date Analyzed: 02/25/2009 1625

Date Prepared: N/A

Analysis Batch: 360-41672

Prep Batch: N/A

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate Chloride	80.0 40.0	82.2 40.4	103	85 - 115 85 - 115	Land Control of the C

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41845

Method: L107-06-1B

Preparation: Distill/Ammonia

Lab Sample ID: MB 360-41845/1-A

Client Matrix: Water

1.0

Dilution: Date Analyzed: 03/04/2009 1714 Date Prepared: 03/03/2009 1320 Analysis Batch: 360-41860 Prep Batch: 360-41845

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 50 mL

Analyte

Ammonia

Result ND./

Qual

RL

RL

0.10

0.10

Lab Control Spike - Batch: 360-41845

Analysis Batch: 360-41860 Prep Batch: 360-41845

Units: mg/L

Method: L107-06-1B

Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-41845/2-A

Client Matrix: Water Dilution:

1.0

Date Analyzed: 03/04/2009 1715 Date Prepared: 03/03/2009 1320

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 50 mL

Analyte

Spike Amount

Result

% Rec.

Limit

Qual

Ammonia

10.0

9.44

94 /

85 - 115

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41620

Method: SM 2510B Preparation: N/A

Lab Sample ID: MB 360-41620/4

Client Matrix: Dilution:

Water 1.0

Date Analyzed: 02/25/2009 0956

Date Prepared: N/A

Analysis Batch: 360-41620

Prep Batch: N/A Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus

Lab File ID: N/A Initial Weight/Volume:

Final Weight/Volume: 1.0 mL

Analyte

Result

Qual

RL

RL

Specific Conductance

ND

1.0

Method: SM 2510B Preparation: N/A

1.0

Lab Control Spike - Batch: 360-41620

Lab Sample ID: LCS 360-41620/1 Client Matrix:

Water 1.0

Date Analyzed: 02/25/2009 0931

Date Prepared: N/A

Analysis Batch: 360-41620

Prep Batch: N/A Units: umhos/cm Instrument ID: MAN-TECH Ion Plus

Lab File ID: N/A Initial Weight/Volume:

Final Weight/Volume: 1.0 mL

Analyte

Dilution:

Spike Amount

Result

% Rec.

Limit

Qual

Specific Conductance

1420

1440

101

85 - 115

Calculations are performed before rounding to avoid round-off errors in calculated results.

Login Sample Receipt Check List

Client: Olin Corporation Job Number: 360-21330-1

Login Number: 21330 List Source: TestAmerica Westfield Creator: Rinard, Kimberley A

List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	4.0 C / 5.0 C
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

TestAmerica Laboratories, Inc. Chain of Custody Form

Test/merica

•53 Southampton Road Westfield, MA 01085 (P) 413-572-4000 (F) 413-572-3707

•149 Rangeway Road N. Billerica, MA 01862 (P) 978-667-1400 (F) 978-667-7871

Quote#	Comments	duested (Special Instructions)	ints section. MCP case narrative		id waste	inther define.				Other Other Other Other Other		Groundwater Metals: Dissolved AI/Cr	Surfacewater Metals: Dissolved/Total	Al/Cr/Na					poor.	waa/K	Cooler ? © / N. Samples Iced? @ / N.	イズハ Temp @ receipt:	
٦ ر		4	and analytes in comments section. For example:	Special Report Format 500-series for drinking water	DEP Form(s) 8000-series for haz/solid waste	t Rpt Use	MCP QA/QC Rpt XX	rity Sles	C Jifroge ulfate ndutiv er met	NaOH to ph NaOH/ZNA None / 4° Chloride, S Specific Co Mitrate, Mitr Specific Co Surfacewat Scoundwate Surfacewate Surfacewate Surfacewate Surfacewate Surfacewate Surfacewate Surfacewate Surfacewate Surfacewate Surfacewate	X X X X X	X X X X	メメメメ	* * * * * * * * * * * * * * * * * * *	× × × × × ×	Х Х Х	× × × × ×	メメメメ	ant in	WA.	D. L	A ARVIO ? Time:	Date: // Tim
Project #: 610 7 09 00 16	erer	2	Contact: David Chapman	Regulatory Classification / Special Re	/ater			Preserva	:7 4 <5 6OH (eless)	Gomp. Comp. # Container Plastic(P) or NaHSO4/M HNO3 to pl HSSO4 to pl HSSO4 to pl	XXX	× × x x x	× × × × × × × × × × × × × × × × × × ×	х х х	X X T X	* * * * * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * * * * * *	× × 00 × × 00 ×			Signature		Time. Recolled hy
	Projec				Rush TAT Requested: NPDES	72 hrs RCRA	5 Day	SW-Surfacewater	A-Air Z-Other	Sampler's Date Initials Collected	3	5W PK 2.24.09	% A B B B B B B B B B B B B B B B B B B	5 2 2 5 K	3 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	5m bc- 2-24-cd	N	4 10			A Dord	Date: 2-24-09	/ Date: /
Client: Olin Chemical/MACTEC	Address: 51 Eames Street	Wilmington, MA 01887	Phone: Fax:	equested Turn Aro	10 Business Day (Std) XX Rush T		Other 48 hrs	_	GW-Groundwater SL-Sludge O-Oil	Sample ID	06 - 1500.3	7 0051 - O O O O O O O O O O O O O O O O O O	20 C - P 2 - 16 RRSW	10 - PZ - 17 RASW	11-48 Ad - 20	0c. pz -18R5w	06-1500-1				Sampled by (print): Douted Chapmon	Relinquished by: Day Chapmagn	Refinoriished/hy:

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White = Lab file Yellow = Report copy Pink = Customer copy STL-8245 (1000)





ANALYTICAL REPORT

Job Number: 360-21354-1

Job Description: Slurry Wall/Cap

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:

For:

Olin Corporation 3855 North Ocoee Street Suite 200 Cleveland, TN 37312-4441

Attention: Mr. Steven Morrow

Approved for release.
Joe Chimi
Report Production Representative

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
03/11/2009

Joseph a. Chem. J.

The test results in this report meet all NELAP requirements for accredited parameters. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced except in full, and with written approval from the laboratory.

TestAmerica Westfield Certifications and Approvals: MADEP MA014, RIDOH57, CTDPH 0494, VT DECWSD, NH DES 2539, NELAP FL E87912 TOX, NELAP NJ MA008 TOX, NELAP NY 10843, NY DOH 10843.

Field sampling is performed under SOPs WE-FLD-001 and WE-FLD-002



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MADEP MCP Analytical Method Report Certification Form **TestAmerica Westfield** 360-21354-1 Laboratory Name: Project #: MADEP RTN¹: Project Location: Slurry Wall/Cap This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)] 360-21354-(1-6) Sample Matrices: Groundwater Soil/Sediment **Drinking Water** Other: 8260B() 8151A() 8330() 6010B (x) 7470A/1A() **MCP SW-846** Other () 9014M²/9012() 8270C() 8081A() VPH() 6020 **Methods Used** 8082 () 8021B() EPH() 7000 S³() 7196A () As specified in MADEP Compendium of 1 List Release Tracking Number (RTN), if known Analytical Methods. 2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method (check all that apply) 3 S - SW-846 Methods 7000 Series List individual method and analyte. An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status No¹ Were all samples received by the laboratory in a condition consistent with Yes $\sqrt{}$ that described on the Chain-of-Custody documentation for the data set? Were all QA/QC procedures required for the specified analytical method(s) Yes No¹ В included in this report followed, including the requirement to note and $\sqrt{}$ discuss in a narrative QC data that did not meet appropriate performance standards or guidelines? No¹ Yes N/A Does the analytical data included in this report meet all the requirements C $\sqrt{}$ for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"? No¹ VPH and EPH methods only: Was the VPH or EPH Method conducted without Yes N/A D significant modifications (see Section 11.3 of respective Methods)? A response to questions E and F below is required for "Presumptive Certainty" status No¹ Ε Were all QC performance standards and recommendations for the Yes specified methods achieved? F N/A No¹ Were results for all analyte-list compounds/elements for the specified Yes $\sqrt{}$ method(s) reported? ¹ All Negative responses must be addressed in an attached Environmental Laboratory case narrative. I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete. mistre twanter suprots Signature: **Position:** Quality Assurance Manager **Printed Name:** Christine Reynolds 3/11/09 15:03 Date: The certification form has been electronically signed and approved. CAM VII A, Rev 3.2 April-04 MADEP MA014 **NELAP FL E87912 TOX** TestAmerica Westfield **NELAP NJ MA008 TOX** NY DOH 10843 53 Southampton Rd. RI DOH 57 NEL AP NY 10843 Westfield, MA 01085 CT DPH 0494 NH DES 253901-A Tel:(413)572-4000 VT DECWSD Fax:(413)572-3707

aboratory	/ Name:	TestAmerica	Westfield		Proje	ect #:	360-2	21354 [.]	-1
roject Lo	cation:	Slurry Wall/Ca	an		MADEP F				
		cations for the follo	<u> </u>	:[list Laboratory	Sample ID Nun	nber(s)1			
0-21354	•					(-/1			
ample M	atrices:	Groundwater		diment	Drinking Water				
CP SW	-846	, ,	8151A ()	8330 ()	6010B ()	7470A/1A		Other	(x)
ethods	Used	` '	8081A ()	VPH()	6020 ()	9014M ² /9	` '		
•	ed in MADEP	` '	8021B ()	EPH()	7000 S ³ ()	7196A ()		
mpendi		1 List Release 7	•	, , ,			. (5.4.0)		
•	Methods. that apply)	2 M - SW-846 N 3 S - SW-846 N				-		Method	d
		onse to questions						s	
Α		ples received by the		-	-		Yes		No ¹
Α		d on the Chain-of-	•				√ √		INO
	Were all QA/0	QC procedures red	quired for the s	pecified analytic	cal method(s)		Yes		No ¹
В		is report followed,	_	•			V		
		arrative QC data t	that did not me	et appropriate p	erformance				
	standards or	guidelines?							
	Does the ana	lytical data include	ed in this report	meet all the re	quirements		Yes	N/A	No ¹
С	for "Presumpt	tive Certainty", as	described in S	ection 2.0 (a), (l	b), (c) and (d) of	f		$\sqrt{}$	
	the MADEP d	ocument CAM VII	I A, " Quality As	ssurance and Q	uality				
	Control Guide	lines for the Acqu	isition and Rep	orting of Analyt	ical Data"?				
	VPH and EPH	H methods only:	Was the VPH	or EPH Method	conducted with	out	Yes	N/A	No ¹
D		odifications (see S					. 55	√ √	
		(
	A respon	se to questions l	E and F below	is required fo	r "Presumptive	Certaint	y" status	3	
Ε	Were all QC p	performance stand	dards and reco	mmendations fo	or the		Yes		No ¹
	specified met	hods achieved?							√
F	Were results	for all analyte-list	compounds/ele	ements for the s	pecified		Yes	N/A	No ¹
	method(s) rep	oorted?						$\sqrt{}$	
	1								
	' All Negative	responses must b	e addressed ir	an attached Ei	nvironmental La	boratory o	ase narr	ative.	
	_	st under the pain	-				onal		
	-	sible for obtainir	_						
alytical	report is, to the	he best of my kn	owledge and	belief, accurate	e and complete	<u>. </u>			
	Signature:	Chiefre,	furcinetel;	eynold8	Position:	Quality A	Assuran	ce Mar	nager
	Printed Name	: Christine Reyn	olds	·.··•	Date:		3/11/09	15:03	
certification	orm has been electronic	ally signed and approved.			CAM VII	A, Rev 3.2		Ар	oril-04
	8	MADEP MA014 NE	ELAP FL E87912 TOX		TestAmerica Westfield				
estA	merica		ELAP NJ MA008 TOX		53 Southampton Rd,				
LEADER IN	NVIRONMENTAL TESTING		ELAP NY 10843	SEO IN ACCORDAN	Westfield, MA 01085				
		CT DPH 0494 N	H DES 253901-A	nebà	Tel:(413)572-4000				

CASE NARRATIVE

Client: Olin Corporation

Project: Slurry Wall/Cap

Report Number: 360-21354-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues as stipulated in the MCP reporting requirements.

In order to facilitate report review, a separate MCP Analytical Method Report Certification Form is included for each method requested.

It should be noted that samples with elevated Reporting Limits (RLs) as a result of a dilution may not be able to satisfy "MCP program" reporting limits in some cases if the "adjusted" RL is greater than the applicable MCP standards or criterion to which the concentration is being compared. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes which exceed the calibration range.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

The samples were received on 02/26/2009; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.2°C.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC and MADEP standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

MCP regulatory standard criteria were not specified for this report. Therefore, method reporting limits (RLs) were not assessed against any MCP standards as it may pertain to Question "E" on the Presumptive Certainty Certification Form (MADEP reference: WSC-CAM-AN-093008 - WSC-CAM Analytical Notes).

DISSOLVED METALS

Samples 360-21354-1 through 360-21354-6 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 02/27/2009.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:

Chromium was detected in method blank MB 360-41739/2 at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

The following reported methods are not listed in the MADEP Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM), pursuant to the provisions of 310 CMR 40.0017(2).

ANIONS

Samples 360-21354-1 through 360-21354-6 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 03/09/2009 and 03/10/2009.

All QC performance standards and recommendations for this specific method were achieved with the exception of:

Chloride failed the MS/MSD recovery criteria low for the matrix spike and matrix spike duplicate of sample 360-21354-5. The associated LCS recovered within control limits. Refer to the QC report for details.

Samples 360-21354-1 through 360-21354-5(10X), 360-21354-5(20X) and 360-21354-6(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

AMMONIA

Samples 360-21354-1 through 360-21354-6 were analyzed for ammonia in accordance with LACHAT 107-06-1B. The samples were prepared on 03/03/2009 and 03/05/2009 and analyzed on 03/04/2009 and 03/06/2009.

All QC performance standards and recommendations for this specific method were achieved with the exception of:

Ammonia failed the MS/MSD recovery criteria low for the matrix spike and matrix spike duplicate of sample 360-21354-2. The associated LCS recovered within control limits. Refer to the QC report for details.

Samples 360-21354-1(10X), 360-21354-2(10X), 360-21354-3(20X), 360-21354-4(10X), 360-21354-5(20X) and 360-21354-6(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-21354-1 through 360-21354-6 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 03/02/2009.

All QC performance standards and recommendations for this specific method were achieved.

This case narrative is available in Word format upon request.

METHOD SUMMARY

Client: Olin Corporation Job Number: 360-21354-1

Description	Lab Location	Method Preparation Method
Matrix: Water		
Dissolved Metals Sample Filtration, Field	TAL WFD TAL WFD	SW846 6010B FIELD_FLTRD
Chloride & Sulfate	TAL WFD	40CFR136A 300.0
Nitrogen Ammonia Distillation, Ammonia	TAL WFD TAL WFD	LACHAT L107-06-1B Distill/Ammonia
Conductivity, Specific Conductance	TAL WFD	SM SM 2510B

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Olin Corporation Job Number: 360-21354-1

Method	Analyst	Analyst ID
SW846 6010B	Nasiatka, Ellen M	EMN
40CFR136A 300.0	Lalashius, Andrew L	ALL
LACHAT L107-06-1B	Lalashius, Andrew L	ALL
SM SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation Job Number: 360-21354-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-21354-1	OC-GW-202S	Ground Water	02/25/2009 0910	02/26/2009 1650
360-21354-2	OC-PZ-18R	Ground Water	02/25/2009 1030	02/26/2009 1650
360-21354-3	OC-GW-79S	Ground Water	02/25/2009 1140	02/26/2009 1650
360-21354-4	OC-PZ-17RR	Ground Water	02/25/2009 1030	02/26/2009 1650
360-21354-5	OC-GW-202D	Ground Water	02/25/2009 0915	02/26/2009 1650
360-21354-6	OC-GW-78S	Ground Water	02/25/2009 1155	02/26/2009 1650

SAMPLE RESULTS

Client Sample ID: OC-GW-202S Lab Sample ID: 360-21354-1 Date Sampled: 02/25/2009 0910
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Job Number: 360-21354-1

Analyte	Result/Q	ualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date A	nalyzed: 02/2	7/2009 1449	
Aluminum	ND		ug/L	2.2	100	1.0
Chromium	4.3	JAB	ug/L	0.17	5.0	1.0
		WM	Male	5/19/09	;	

Job Number: 360-21354-1

Client Sample ID: OC-GW-202S Lab Sample ID: 360-21354-1 Date Sampled: 02/25/2009 0910
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Ana	lyzed:	03/09/2009 2059	
Sulfate	500	mg/L	20	20	10
Chloride	50 J	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:		03/04/2009 1740	
Prep Method: Distill/Ammonia		Date Prepared:		03/03/2009 1320	
Ammonia	99	mg/L	1.0	1.0	10
Method: SM 2510B		Date Ana	lyzed:	03/02/2009 1200	
Specific Conductance	1400	umhos/cm	1.0	1.0	1.0

MM/MM 5/19/09

Client Sample ID: OC-PZ-18R Lab Sample ID: 360-21354-2 Date Sampled: 02/25/2009 1030 Date Received: 02/26/2009 1650 Client Matrix: Ground Water

p/19/1 (dilu 5/19/09

Job Number: 360-21354-1

Analyte	Result/Q	ualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date A	nalyzed: 02/2	7/2009 1507	
Aluminum	4.6	J	ug/L	2.2	100	1.0
Chromium	15	-	ug/L	0.17	5.0	1.0

Job Number: 360-21354-1

Client Sample ID: OC-PZ-18R Lab Sample ID: 360-21354-2 Date Sampled: 02/25/2009 1030
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Ana	ılyzed:	03/09/2009 2129	
Sulfate	220	mg/L	20	20	10
Chloride	130 ブ	mg/L	10	10	10
Method: L107-06-1B		Date Analyzed:		03/06/2009 1331	
Prep Method: Distill/Ammonia		Date Prepared: 03/05/2009		03/05/2009 1145	
Ammonia	76	mg/L	1.0	1.0	10
Method: SM 2510B		Date Ana	lyzed:	03/02/2009 1202	
Specific Conductance	1000	umhos/cm	1.0	1.0	1.0

My Mh sholer

Client Sample ID: OC-GW-79S Lab Sample ID: 360-21354-3

Date Sampled: 02/25/2009 1140
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Job Number: 360-21354-1

Analyte	Result/0	Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date A	nalyzed: 02/2	7/2009 1510	
Aluminum	18	J	ug/L	2.2	100	1.0
Chromium	6.6	B	ug/L	0.17	5.0	1.0
			Malli	L 5/171	69	

Page 15 of 39

Job Number: 360-21354-1

Client Sample ID: OC-GW-79S Lab Sample ID: 360-21354-3 Date Sampled: 02/25/2009 1140
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Ana	lyzed:	03/09/2009 2159	
Sulfate	1100	mg/L	20	20	10
Chloride	170 ろ	mg/L	10	10	10
Method: L107-06-1B		Date Ana	lyzed:	03/06/2009 1333	
Prep Method: Distill/Ammonia		Date Pre	pared:	03/05/2009 1145	
Ammonia	190	mg/L	2.0	2.0	20
Method: SM 2510B		Date Ana	lyzed:	03/02/2009 1203	
Specific Conductance	3200	umhos/cm	1.0	1.0	1.0

MAJJA. Olh stister

Client Sample ID: OC-PZ-17RR Lab Sample ID: 360-21354-4

Date Sampled: 02/25/2009 1030
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Job Number: 360-21354-1

Analyte	Result/Q	ualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date A	nalyzed: 02/2	7/2009 1513	
Aluminum	4.6	J /	ug/L	2.2	100	1.0
Chromium	2.9	J B	ug/L ug/L	0.17	5.0	1.0
		p	11/1/1	Aller s	119/09	

Job Number: 360-21354-1

Client Sample ID: OC-PZ-17RR Lab Sample ID: 360-21354-4

Date Sampled: 02/25/2009 1030
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0	_	Date Ana	alyzed:	03/09/2009 2214	
Chloride	17 了	mg/L	1.0	1.0	1.0
Method: 300.0		Date Ana	alyzed:	03/09/2009 2229	
Sulfate	510	mg/L	20	20	10
Method: L107-06-1B		Date Ana	alyzed:	03/06/2009 1334	
Prep Method: Distill/Ammonia		Date Pre	pared:	03/05/2009 1145	
Ammonia	75	mg/L	1.0	1.0	10
Method: SM 2510B		Date Ana	alyzed:	03/02/2009 1205	
Specific Conductance	1400	umhos/cm	1.0	1.0	1.0

MMM Stralog

Client Sample ID: OC-GW-202D Lab Sample ID: 360-21354-5

Date Sampled: 02/25/2009 0915
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Job Number: 360-21354-1

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date A	nalyzed: 02/2	7/2009 1516	
Aluminum	14000	ug/L	2.2	100	1.0
Chromium	940	ug/L	0.17	5.0	1.0
		n/M/	Ellin.	5/19/09	

Job Number: 360-21354-1

Client Sample ID: OC-GW-202D Lab Sample ID: 360-21354-5

Date Sampled: 02/25/2009 0915
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Ana	alyzed:	03/10/2009 0000	
Chloride	300 J	mg/L	10	10	10
Method: 300.0		Date Ana	alyzed:	03/10/2009 1647	
Sulfate	2000	mg/L	40	40	20
Method: L107-06-1B		Date Ana	alyzed:	03/06/2009 1335	
Prep Method: Distill/Ammonia		•		03/05/2009 1145	
Ammonia	360	mg/L	2.0	2.0	20
Method: SM 2510B		Date Ana	alyzed:	03/02/2009 1206	
Specific Conductance	5100	umhos/cm	1.0	1.0	1.0

MMMULL Striles

Mr. Steven Morrow Olin Corporation 3855 North Ocoee Street Suite 200 Cleveland, TN 37312-4441

Client Sample ID: OC-GW-78S Lab Sample ID: 360-21354-6 Date Sampled: 02/25/2009 1155 Date Received: 02/26/2009 1650 Client Matrix: Ground Water

Job Number: 360-21354-1

Analyte	Result/0	Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date A	nalyzed: 02/2	7/2009 1519	
Aluminum	7.7	J _	ug/L	2.2	100	1.0
Chromium	5.5	B	ug/L ug/L	0.17	5.0	1.0
		fr	1/1/10	alle s	119 109	

Mr. Steven Morrow Olin Corporation 3855 North Ocoee Street Suite 200 Cleveland, TN 37312-4441 Job Number: 360-21354-1

Client Sample ID: OC-GW-78S Lab Sample ID: 360-21354-6 Date Sampled: 02/25/2009 1155
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0		Date Ana	alyzed:	03/10/2009 0045	
Chloride	22 ゴ	mg/L	1.0	1.0	1.0
Method: 300.0		Date Ana	alyzed:	03/10/2009 0100	
Sulfate	620	mg/L	20	20	10
Method: L107-06-1B		Date Ana	alyzed:	03/06/2009 1336	
Prep Method: Distill/Ammonia		Date Pre	pared:	03/05/2009 1145	
Ammonia	94	mg/L	1.0	1.0	10
Method: SM 2510B		Date Ana	alyzed:	03/02/2009 1208	
Specific Conductance	1300	umhos/cm	1.0	1.0	1.0

MMA (Sin sterles

DATA REPORTING QUALIFIERS

Client: Olin Corporation Job Number: 360-21354-1

Lab Section	Qualifier	Description
Metals		
	В	Compound was found in the blank and sample.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
General Chemistry		
	F	MS or MSD exceeds the control limits
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.

QUALITY CONTROL RESULTS

Client: Olin Corporation Job Number: 360-21354-1

QC Association Summary

		Report			
Lab Sample ID	Client Sample ID	Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:360-4	1739				
LCS 360-41739/1	Lab Control Spike	T	Water	6010B	
LCSD 360-41739/7	Lab Control Spike Duplicate	Т	Water	6010B	
MB 360-41739/2	Method Blank	T	Water	6010B	
360-21354-1	OC-GW-202S	D	Water	6010B	
360-21354-1DU	Duplicate	D	Water	6010B	
360-21354-1MS	Matrix Spike	D	Water	6010B	
360-21354-2	OC-PZ-18R	D	Water	6010B	
360-21354-3	OC-GW-79S	D	Water	6010B	
360-21354-4	OC-PZ-17RR	D	Water	6010B	
360-21354-5	OC-GW-202D	D	Water	6010B	
360-21354-6	OC-GW-78S	D	Water	6010B	

Report Basis

D = Dissolved

T = Total

Client: Olin Corporation Job Number: 360-21354-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-4	1761				
LCS 360-41761/1	Lab Control Spike	Т	Water	SM 2510B	
MB 360-41761/12	Method Blank	Т	Water	SM 2510B	
360-21354-1	OC-GW-202S	Т	Water	SM 2510B	
360-21354-2	OC-PZ-18R	Т	Water	SM 2510B	
360-21354-3	OC-GW-79S	Т	Water	SM 2510B	
360-21354-4	OC-PZ-17RR	Т	Water	SM 2510B	
360-21354-5	OC-GW-202D	Т	Water	SM 2510B	
360-21354-6	OC-GW-78S	Т	Water	SM 2510B	
360-21354-6DU	Duplicate	Т	Water	SM 2510B	
Prep Batch: 360-4184	5				
LCS 360-41845/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-41845/1-A	Method Blank	T	Water	Distill/Ammonia	
360-21354-1	OC-GW-202S	Т	Water	Distill/Ammonia	
Analysis Batch:360-4	1860				
LCS 360-41845/2-A	Lab Control Spike	T	Water	L107-06-1B	360-41845
MB 360-41845/1-A	Method Blank	T	Water	L107-06-1B	360-41845
360-21354-1	OC-GW-202S	Т	Water	L107-06-1B	360-41845
Prep Batch: 360-4191	5				
LCS 360-41915/2-A	Lab Control Spike	Т	Water	Distill/Ammonia	
MB 360-41915/1-A	Method Blank	Т	Water	Distill/Ammonia	
360-21354-2	OC-PZ-18R	T	Water	Distill/Ammonia	
360-21354-2MS	Matrix Spike	T	Water	Distill/Ammonia	
360-21354-2MSD	Matrix Spike Duplicate	T	Water	Distill/Ammonia	
360-21354-3	OC-GW-79S	Т	Water	Distill/Ammonia	
360-21354-4	OC-PZ-17RR	T	Water	Distill/Ammonia	
360-21354-5	OC-GW-202D	T	Water	Distill/Ammonia	
360-21354-6	OC-GW-78S	Т	Water	Distill/Ammonia	
Analysis Batch:360-4	1958				
LCS 360-41915/2-A	Lab Control Spike	Т	Water	L107-06-1B	360-41915
MB 360-41915/1-A	Method Blank	Т	Water	L107-06-1B	360-41915
360-21354-2	OC-PZ-18R	T	Water	L107-06-1B	360-41915
360-21354-2MS	Matrix Spike	Т	Water	L107-06-1B	360-41915
360-21354-2MSD	Matrix Spike Duplicate	T	Water	L107-06-1B	360-41915
360-21354-3	OC-GW-79S	Т	Water	L107-06-1B	360-41915
360-21354-4	OC-PZ-17RR	Т	Water	L107-06-1B	360-41915
360-21354-5	OC-GW-202D	Т	Water	L107-06-1B	360-41915
360-21354-6	OC-GW-78S	Т	Water	L107-06-1B	360-41915

Client: Olin Corporation Job Number: 360-21354-1

QC Association Summary

		Report			
Lab Sample ID	Client Sample ID	Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-420	066				
LCS 360-42066/2	Lab Control Spike	Т	Water	300.0	
MB 360-42066/1	Method Blank	T	Water	300.0	
360-21354-1	OC-GW-202S	T	Water	300.0	
360-21354-2	OC-PZ-18R	T	Water	300.0	
360-21354-3	OC-GW-79S	T	Water	300.0	
360-21354-4	OC-PZ-17RR	Т	Water	300.0	
Analysis Batch:360-420	067				
LCS 360-42067/2	Lab Control Spike	Т	Water	300.0	
MB 360-42067/1	Method Blank	Т	Water	300.0	
360-21354-5	OC-GW-202D	T	Water	300.0	
360-21354-5MS	Matrix Spike	T	Water	300.0	
360-21354-5MSD	Matrix Spike Duplicate	T	Water	300.0	
360-21354-6	OC-GW-78S	T	Water	300.0	
Analysis Batch:360-420	070				
LCS 360-42070/2	Lab Control Spike	Т	Water	300.0	
MB 360-42070/1	Method Blank	Т	Water	300.0	
360-21354-5	OC-GW-202D	Т	Water	300.0	
360-21354-5MS	Matrix Spike	Т	Water	300.0	
360-21354-5MSD	Matrix Spike Duplicate	Т	Water	300.0	

Report Basis

T = Total

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-41739

Method: 6010B Preparation: N/A dissiped wishold

Lab Sample ID: MB 360-41739/2

Client Matrix: Water Dilution:

1.0

Date Analyzed: 02/27/2009 1429

Date Prepared: N/A

Analysis Batch: 360-41739

Prep Batch: N/A

Units: ug/L

Instrument ID: Varian 720 ES ICP

Lab File ID: N/A Initial Weight/Volume:

Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND	J	2.2	100
Chromium	0.24		0.17	5.0

Lab Control Spike/

Lab Control Spike Duplicate Recovery Report - Batch: 360-41739

Method: 6010B Preparation: N/A

LCS Lab Sample ID: LCS 360-41739/1

Client Matrix:

Water

Dilution:

1.0 02/27/2009 1426

Date Analyzed: Date Prepared:

N/A

LCSD Lab Sample ID: LCSD 360-41739/7

Client Matrix:

Dilution:

Date Analyzed: 02/27/2009 1501

Date Prepared:

N/A

Analysis Batch: 360-41739

Prep Batch: N/A

Units: ug/L

Instrument ID: Varian 720 ES ICP

Lab File ID: N/A Initial Weight/Volume:

Final Weight/Volume:

10 mL

Water

1.0

Analysis Batch: 360-41739

Prep Batch: N/A

Units: ug/L

Instrument ID: Varian 720 ES ICP

Lab File ID: Initial Weight/Volume:

Final Weight/Volume: 10 mL

<u>% Rec.</u>								
Analyte	LCS	LCSD	Limit	RPD	RPD Limit LCS Qual LCSD Qual			
Aluminum	98	97	80 - 120	1	20			
Chromium	99 /	98 /	80 - 120	1	20			
		1						

Client: Olin Corporation

Job Number: 360-21354-1

Matrix Spike - Batch: 360-41739

Method: 6010B Preparation: N/A

Lab Sample ID: 360-21354-1

Client Matrix: Water Dilution:

1.0

Date Analyzed: 02/27/2009 1455

Date Prepared: N/A

Analysis Batch: 360-41739

Prep Batch: N/A

Units: ug/L

Instrument ID: Varian 720 ES ICP

Lab File ID: N/A Initial Weight/Volume:

Final Weight/Volume: 10 mL

Analyte	Sample Resu	lt/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Aluminum	ND	Marine Colo	5000	4700	94	75 - 125	
Chromium	4.3	J	1000	931	93 /	75 - 125	

Duplicate - Batch: 360-41739

Method: 6010B Preparation: N/A

Lab Sample ID: 360-21354-1

Client Matrix: Water

Dilution: 1.0

Date Analyzed: 02/27/2009 1452

Date Prepared: N/A

Analysis Batch: 360-41739

Prep Batch: N/A

Units: ug/L

Instrument ID: Varian 720 ES ICP

Lab File ID: N/A Initial Weight/Volume:

Final Weight/Volume: 1.0 mL

Analyte	Sample R	esult/Qual	Result	RPD	Limit	Qual
Aluminum	ND	тиминаруу нь у у тимину;— эл эл элгэлжийн халан харагай г тага ч	ND	NC	20	anananananan alamanan ya wa tek de ye ye "Millaranan "
Chromium	4.3	J	4.24	1 🖊	20	J

Job Number: 360-21354-1 Client: Olin Corporation

Method Blank - Batch: 360-42066

Method: 300.0 Preparation: N/A

Lab Sample ID: MB 360-42066/1

Client Matrix: Water

Dilution: 1.0

Date Analyzed: 03/09/2009 1641

Date Prepared: N/A

Analysis Batch: 360-42066

Prep Batch: N/A

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND ND	an annua an ga an angga 1920 a angga 1921 - Labo da Parkanaga Sara	2.0	2.0
Chloride	ND /		1.0	1.0

Lab Control Spike - Batch: 360-42066

Method: 300.0 Preparation: N/A

Lab Sample ID: LCS 360-42066/2

Client Matrix: Water Dilution:

1.0

Date Analyzed: 03/09/2009 1656

Date Prepared: N/A

Analysis Batch: 360-42066

Prep Batch: N/A

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate Chloride	80.0 40.0	80.2 40.1	100	85 - 115 85 - 115	April 16 - 5 Million Manifester

Client: Olin Corporation Job Number: 360-21354-1

Method Blank - Batch: 360-42067 Method: 300.0 Preparation: N/A

Preparation: N/A

Lab Sample ID: MB 360-42067/1

Client Matrix: Water

Dilution: 1.0

Date Analyzed: 03/09/2009 2315

Date Prepared: N/A

Analysis Batch: 360-42067

Prep Batch: N/A

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL	
Sulfate	ND	May 2 29 processor - Service - Servi	2.0	2.0	men to see a f. of to become
Chloride	ND./		1.0	1.0	

Lab Control Spike - Batch: 360-42067 Method: 300.0 Preparation: N/A

Lab Sample ID: LCS 360-42067/2

Client Matrix: Water Dilution: 1.0

Date Analyzed: 03/09/2009 2330

Date Prepared: N/A

Analysis Batch: 360-42067

Prep Batch: N/A

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate Chloride	80.0 40.0	80.4 40.1	100	85 - 115 85 - 115	ng gygggggggggggggggggggggggggggggggggg

Client: Olin Corporation

Job Number: 360-21354-1

Matrix Spike/

Matrix Spike Duplicate Recovery Report - Batch: 360-42067

Method: 300.0 Preparation: N/A

MS Lab Sample ID:

360-21354-5

Analysis Batch: 360-42067

Instrument ID: No Equipment Assigned

Client Matrix:

Water

N/A

Dilution:

10

Prep Batch: N/A

Lab File ID:

Initial Weight/Volume: 1.0 mL

Date Analyzed:

03/10/2009 0015

Final Weight/Volume: 10 mL

Date Prepared:

N/A

MSD Lab Sample ID: 360-21354-5

Water

Analysis Batch: 360-42067

Instrument ID: No Equipment Assigned

Client Matrix:

Dilution:

10

Prep Batch: N/A

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 10 mL

Date Analyzed: Date Prepared: 03/10/2009 0030 N/A

% Rec.

Limit

RPD

RPD Limit

MS Qual MSD Qual

Analyte Chloride

75 - 125

5.9 Mollether

Client: Olin Corporation Job Number: 360-21354-1

Method Blank - Batch: 360-42070 Method: 300.0 Preparation: N/A

Lab Sample ID: MB 360-42070/1

Client Matrix: Water

Dilution: 1.0

Date Analyzed: 03/10/2009 1617

Date Prepared: N/A

Analysis Batch: 360-42070

Prep Batch: N/A

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND //	COLUMN AND AND CONTROL OF THE PROPERTY OF THE	2.0	2.0
Chloride	ND /		1.0	1.0

Lab Control Spike - Batch: 360-42070 Method: 300.0 Preparation: N/A

Lab Sample ID: LCS 360-42070/2

Client Matrix: Water Dilution: 1.0

Date Analyzed: 03/10/2009 1632

Date Prepared: N/A

Analysis Batch: 360-42070

Prep Batch: N/A

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	79.3	99	85 - 115	CONTRACTOR OF THE PROPERTY CONTRACTOR OF THE COST
Chloride	40.0	39.8	99	85 - 115	

Client: Olin Corporation

Job Number: 360-21354-1

Matrix Spike/

Matrix Spike Duplicate Recovery Report - Batch: 360-42070

Method: 300.0 Preparation: N/A

MS Lab Sample ID:

360-21354-5

Analysis Batch: 360-42070

Instrument ID: No Equipment Assigned

Client Matrix:

Water

Lab File ID:

Dilution:

20

N/A

Initial Weight/Volume: 1.0 mL

Date Analyzed:

03/10/2009 1702

Final Weight/Volume: 10 mL

MS Qual MSD Qual

Date Prepared:

N/A

MSD Lab Sample ID: 360-21354-5

Analysis Batch: 360-42070

Instrument ID: No Equipment Assigned

Client Matrix:

Water

Prep Batch: N/A

Prep Batch: N/A

Lab File ID: N/A

RPD Limit

Initial Weight/Volume: 1.0 mL

Date Analyzed:

Dilution:

Analyte

Sulfate

20 03/10/2009 1717

Final Weight/Volume: 10 mL

Date Prepared:

N/A

% Rec. MS MSD Limit 75 - 125

5/12/09

RPD

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-41845

Method: L107-06-1B

Preparation: Distill/Ammonia

Lab Sample ID: MB 360-41845/1-A

Client Matrix: Water

1.0

Date Prepared: 03/03/2009 1320

Date Analyzed: 03/04/2009 1714

Analysis Batch: 360-41860 Prep Batch: 360-41845

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 50 mL

Analyte

Dilution:

Result

Qual

RL

RL

Ammonia

ND /

0.10

0.10

Lab Control Spike - Batch: 360-41845

Method: L107-06-1B

Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-41845/2-A

Client Matrix: Water

Dilution:

1.0

Date Analyzed: 03/04/2009 1715 Date Prepared: 03/03/2009 1320

Analysis Batch: 360-41860

Prep Batch: 360-41845

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 50 mL

Analyte

Spike Amount

Result

% Rec.

Limit

Qual

Ammonia

10.0

9.44

94 /

85 - 115

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Olin Corporation Job Number: 360-21354-1

Method Blank - Batch: 360-41915 Method: L107-06-1B

Preparation: Distill/Ammonia

Lab Sample ID: MB 360-41915/1-A

Client Matrix: Water

Dilution: 1.0

Date Analyzed: 03/06/2009 1307 Date Prepared: 03/05/2009 1145 Analysis Batch: 360-41958 Prep Batch: 360-41915

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND /	- 54 SAAMAAA SAAWAA - 547 O SAAMAAA SAAWAA	0.10	0.10

Method: L107-06-1B Lab Control Spike - Batch: 360-41915

Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-41915/2-A

Client Matrix: Water Dilution: 1.0

Date Analyzed: 03/06/2009 1308 Date Prepared: 03/05/2009 1145 Analysis Batch: 360-41958 Prep Batch: 360-41915

Units: mg/L

Instrument ID: No Equipment Assigned

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.20	92 /	85 - 115	And the state of t

Matrix Spike/ Method: L107-06-1B

Matrix Spike Duplicate Recovery Report - Batch: 360-41915 Preparation: Distill/Ammonia

360-21354-2 MS Lab Sample ID:

Client Matrix:

Dilution:

Water

03/06/2009 1332

10

Analysis Batch: 360-41958 Prep Batch: 360-41915

Lab File ID: N/A

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 50 mL

Date Analyzed: Date Prepared: 03/05/2009 1145

MSD Lab Sample ID: 360-21354-2 Client Matrix: Water

Dilution:

10

Date Analyzed: 03/06/2009 1332 Date Prepared: 03/05/2009 1145 Analysis Batch: 360-41958

Prep Batch: 360-41915

Instrument ID: No Equipment Assigned

Instrument ID: No Equipment Assigned

Lab File ID:

Initial Weight/Volume: 1.0 mL Final Weight/Volume: 50 mL

MSD Limit **RPD** MS Qual MSD Qual Analyte MS 75 - 125 Ammonia -86

Calculations are performed before rounding to avoid round-off errors in calculated results.

TestAmerica Westfield

Page 36 of 39

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-41761

Method: SM 2510B Preparation: N/A

Lab Sample ID: MB 360-41761/12

Client Matrix: Water

Dilution: 1.0

Date Analyzed: 03/02/2009 1212

Date Prepared: N/A

Analysis Batch: 360-41761

Prep Batch: N/A Units: umhos/cm Instrument ID: MAN-TECH Ion Plus

Lab File ID: N/A Initial Weight/Volume:

Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Spike - Batch: 360-41761

Lab Sample ID: LCS 360-41761/1

Client Matrix: Water

Dilution: 1.0

Date Prepared: N/A

Date Analyzed: 03/02/2009 1156

Analysis Batch: 360-41761

Prep Batch: N/A Units: umhos/cm Instrument ID: MAN-TECH Ion Plus

Lab File ID: N/A Initial Weight/Volume:

Method: SM 2510B

Preparation: N/A

Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1420	1410	99	85 - 115	CONTRACTOR AND AND A STATE OF THE STATE OF T

Duplicate - Batch: 360-41761

Method: SM 2510B Preparation: N/A

Lab Sample ID: 360-21354-6

Client Matrix: Water

1.0

Dilution:

Date Analyzed: 03/02/2009 1209

Date Prepared: N/A

Analysis Batch: 360-41761

Prep Batch: N/A

Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus Autoti

Lab File ID: N/A Initial Weight/Volume:

Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Specific Conductance	1300	1340	NA Sle	20 Vila 5/19/09	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Login Sample Receipt Check List

Client: Olin Corporation Job Number: 360-21354-1

Login Number: 21354 List Source: TestAmerica Westfield Creator: Rinard, Kimberley A

List Number: 1

Question	T / F/ NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	2.2 C
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

TestAmerica Laboratories, Inc. **Chain of Custody Form**

TestAmerica 3@21354

\$3 Southampton Road
 Westfield, MA 01085
 (P) 413-572-4000
 (F) 413-572-3707

•149 Rangeway Road N. Billerica, MA 01862 (P) 978-667-1400 (F) 978-667-7871

100 March 100 Ma	Comments	(Special Instructions)	MCP case narrative		-					Do Not KAY		Dissolved metals are field filtered.	Groundwater Metals: Dissolved AI/Cr	Surfacewater Metals: Dissolved/Total	Al/Cr/Na						Cooler 2(9) N Samples Iced	Temp @ receipt: 23°C °C	Preservation/pH checked	By. Var Date: 2/26 Pc
Job# Quote#	Shaded areas for office use	Analysis Requested Check analysis and specify method	and analytes in comments section. For example:	500-series for drinking water	8000-series for haz/solid waste	Use comments section to further define.		SISTER SISTER	rite T ier m ter m	, Mit Iswb	Milhate Groun Sedim Other Other Other		×	×		×	×			/		Date: / Time: なん/0 9 / スペS	Date; Time: 1/46/09 (16570)	ple
Project #: 61079001 / 04	3	1 1	Contact: David Chapman	Regulatory Classification / Special Report Format	Drinking Water	——— MCP GW1/S1 ———	וויכי מייניים אייני	Freservative	Glassunitation of the Chilant of the	onine (q o) or (d o)	Grab HCI to HCI to HCI to HCI to HCI to HCI to HCI to	38XX	XXXX	XXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	$\mathbb{X}_{\mathbb{X}}^{\mathbb{X}}$ \mathbb{X} \mathbb{X} \mathbb{X} \mathbb{X} \mathbb{X} \mathbb{X} \mathbb{X} \mathbb{X} \mathbb{X}	$X \times X \times$				Jun hal	u Lag 2	Received by Mal	TestAmerica-Westfield
Client: Olin Chemical/MACTEC '	Address: 51 Eames Street	Wilmington, MA 01887	Phone: Fax:	Requested Turn Around Time Reg	Requested:	siness Day 24 hrs	Sample Type Codes	Sample Type Codes WW-Wastewater DW-Drinking water SW-Surfacewater W-Labwater GW-Groundwater A-Air	SL-Studge O-Oil	9	Digital Sample also also also also also also also also	2 779C	7	12 778 Sbt-MJ- 708	20C-PZ-17RR 1066 2	4	12 -170 A 58 # - NO DO	1 7	XX XX	7 5%77	Sampled by (print): DARDIND CHARMAN	Relinquished by: David in parameter 9 126/09	Relinquished by: Date: D	Method of shipment:

White = Lab file Yellow = Report copy Pink = Customer copy STL-8245 (1000)